FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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Flight.

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EDITORIAL COMMENT.

Aerial Defence and its Urgency.

In matters connected with aerial defence we have always contended—no longer ago than last week we again insisted on this point—that only by the creation of a strong volume of public opinion can the hands of responsible Ministers be strengthened to the point at which they can wring from an unwilling Treasury sufficient to set our house in order. In the work of creating that volume of opinion we necessarily depend to a very great extent upon the Press of the country, and, to say simple truth, the Press is manifesting a far clearer understanding of the needs of the moment than is shown by those more directly responsible. In fact, almost with one accord and with one voice the great daily newspapers are endeavouring to drive home the urgency of the situation and to educate the man in the street to the need that exists for bringing pressure to bear in the proper quarters.

Democratic government is a good thing, but it has certain disadvantages of its own as compared with systems in which more autocratic methods obtain. Where government is of the kind described as being "by the people, for the people"—and incidentally at the expense of the people—there must always present itself the difficulty of the "ins and outs." The party which is in power must at all times keep a close watch on the polling booths, otherwise there is always the probability to be reckoned with that the reins of office—and the spoils thereof—will fall into the hands of those on the other side. Therefore, the first thing to be thought of in connection with new movements and new measures is the crucial question of whether or not they are likely to be "popular," or, in other words, whether they can be depended upon to retain votes for the party in power, or whether, on the other hand they are likely to transfer the suffrages of the electors to the opposition. Alternatively, the question is whether matters of negative value from the vote-catching point of view shall be allowed to slide in favour of something which will influence the electors, even though the Government of the day realises well enough that the matter is one of such urgency as to be almost vital. Aerial defence is, at the moment, one of these questions of negative value. There has not yet been created the necessary volume of opinion to impress it on the minds of the Government as a whole, that if they neglect the question the consequences to them may be as serious as those of the historic "Cordite Vote." Were that opinion existent, there would be no need for us to write on the subject—we should be as strong in the air as we are at sea.

In last Monday's issue of our contemporary, the *Morning Post*, there appeared an excellent leading article on the subject of the forthcoming Navy and Army Estimates, which is well worthy the attention of every seriously minded man who gives more than a passing thought to our preparedness for war, and the fatal consequences which may easily follow upon its neglect. The *Morning Post* says:—

"It is to be hoped that when the Estimates for the Navy and the Army are introduced this year, the First Lord and the Secretary of State will give the House of Commons clear accounts of their policy in regard to aerial navigation. For some time past it has been held probable that in the next war the Power that has the more skilful aeronauts will have a great advantage both by sea and land. It is not yet clear whether or not the airmen will be able by acts of destruction to exert much influence on the course of battles, but it is believed that aerial scouting when successful will give to the Commander-in-Chief whose scouts can accomplish it a long start of his adversary and that the handicap thus placed on his opponent will be heavy. The difference will be that between knowing the

enemy's moves and guessing them. That being the case, prudence prescribes that the two Departments that have to do with the operations of war should diligently study the progress of aeronautics and all its applications to the operations of war by sea and land. The knowledge thus obtained should be incessantly applied to the provision of such kinds of airships and aeroplanes as have been proved to be capable of service, as well as of officers and crews for their management. Moreover, the strategists of both Services, as well as the Admirals commanding squadrons and the Generals commanding divisions, should have under their orders a sufficient number of aircraft to insure their becoming familiar with the uses to which they can be put, and with the kind of instructions with which their aerial scouts ought to be furnished in the successive stages of a campaign. So far as we are aware, these various needs are well understood at both offices, and do not require to be suggested. What we have in view is an annual report for each Service, showing what progress has been made, and what further measures are contemplated. Such reports have a double use; their preparation causes the Departments concerned to take stock of their work and of their plans, and their publication, if and when they show real progress, reassures the public, which is rendered uneasy by vague or ambiguous language in regard to the condition of the two Services, and still more uneasy by reports of which the form or substance fails to carry conviction."

We are entirely with our contemporary, not only in the matter of providing adequately for aircraft and their *personnel*, but in the issue of the annual report suggested in the quotation we have made. One of our troubles is that there is far too much of mystery made in matters which it would do no conceivable harm to make public, but, on the contrary, would work towards a good end were the nation only taken into the confidence of the Government, as indeed it has a right to be. We are not referring now to matters which are of a nature which would prove of use to a possible enemy, but those of broad policy, and which involve certain details which ultimately become known to everyone through outside channels, and which, if communicated by responsible departments, would have a reassuring effect on the public mind. Take, for example, the unedifying spectacle that was witnessed not so long ago of a War Minister trying to juggle with facts across the floor of the House in the face of knowledge possessed by those to whom he was giving the lie by implication. Had such a report as that suggested by the *Morning Post* been issued prior to the submission of the Estimates to Parliament, there would have been no need for cross-examination on detail, since the broad lines of the Government policy would have been in possession of the nation, and all that would have been needful would have been a definite assurance that those lines were being followed.

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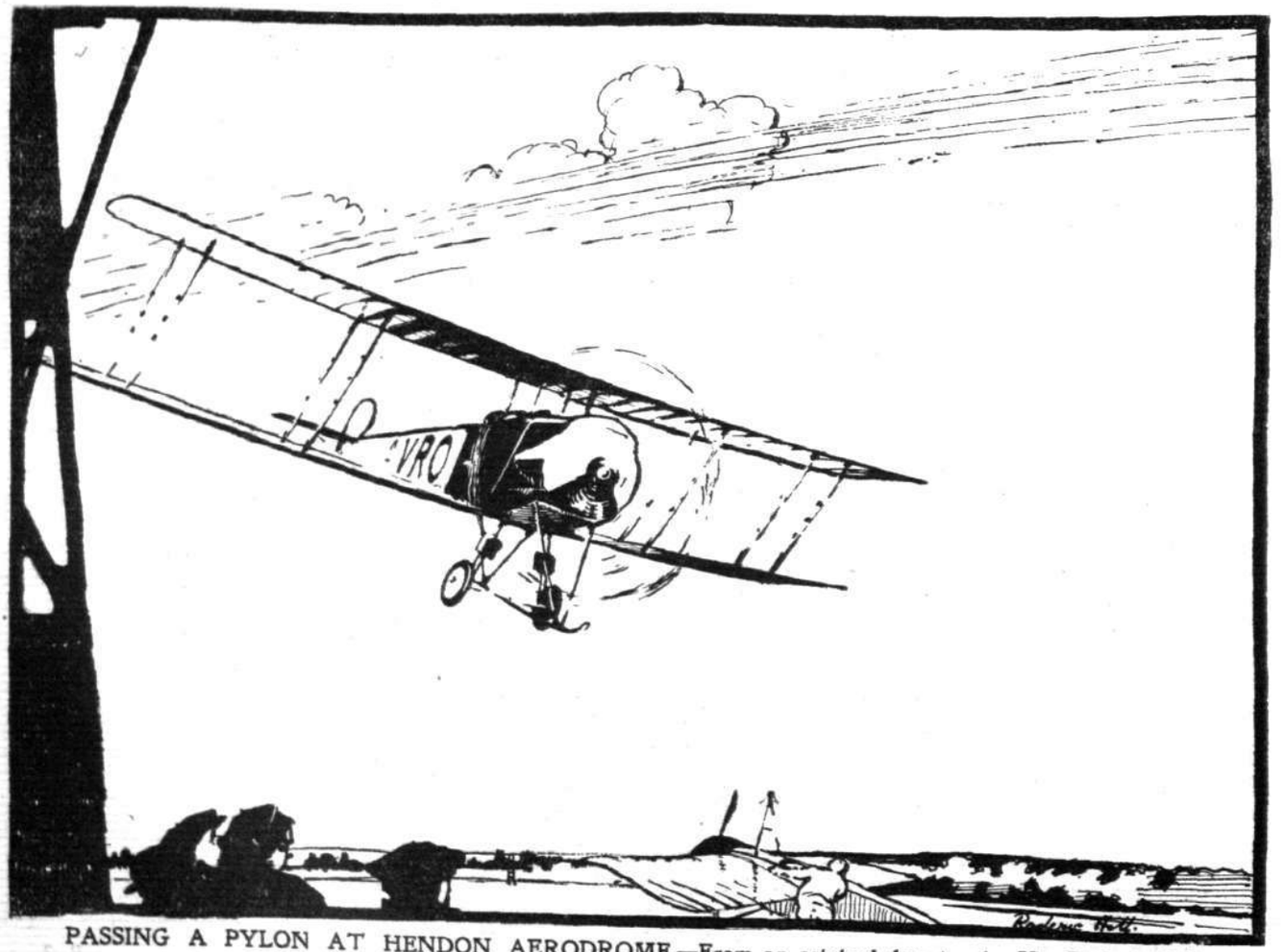
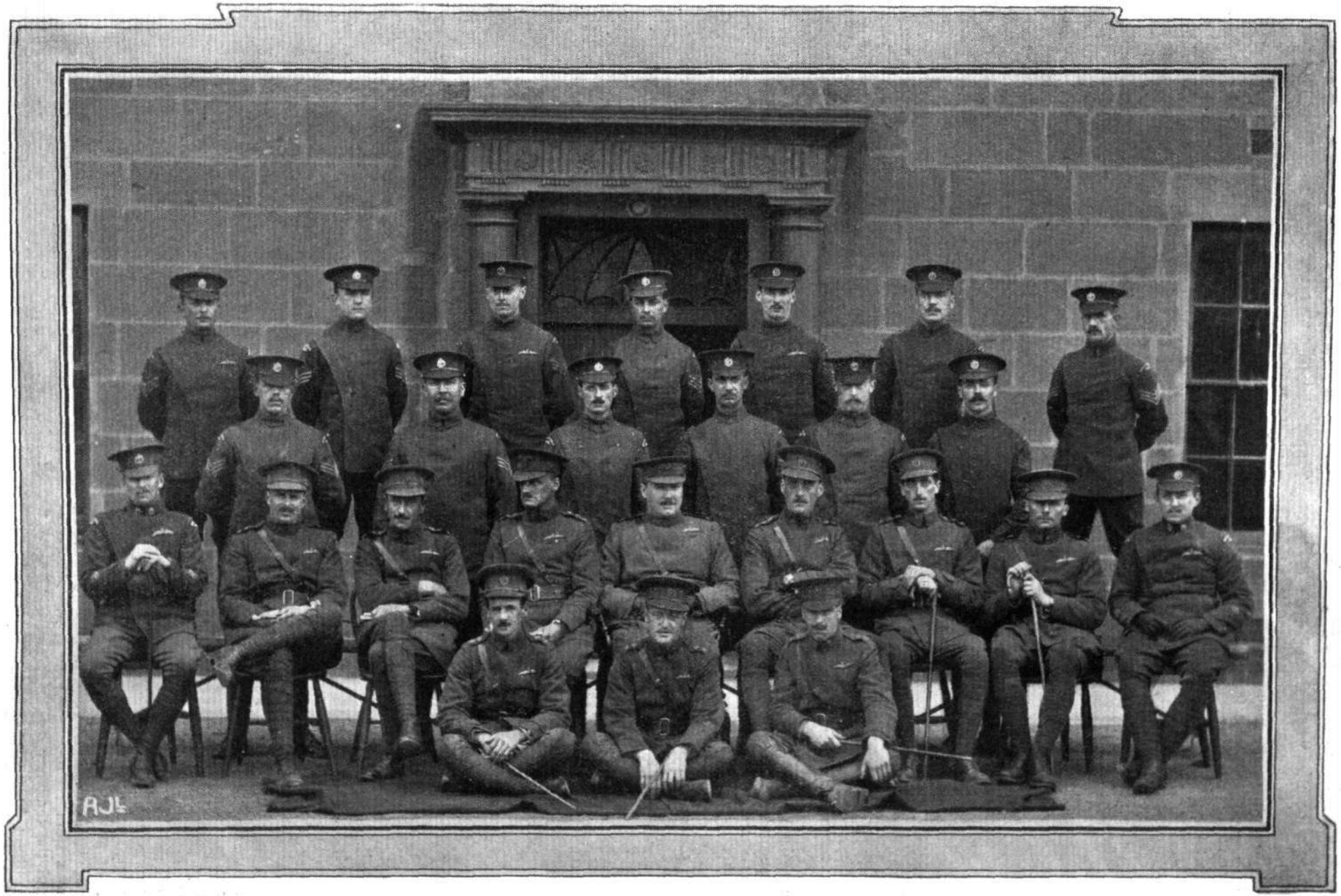
Orville Wright on the Future.

SPEAKING at the banquet by the Aero Club of America in New York on December 17th, the tenth anniversary of the first flight by the Wrights on a power-driven machine, Orville Wright said that in the near future aeroplanes would be used to carry mails in many of the States such as Arizona, New Mexico, Utah, &c., where they could do better work than the railroads. He thought that the development of the heavier-than-air machine during the next decade would be beyond the most sanguine expectations. He went on to say that he thought the flying boat had a great future for sport, as it produced the thrills of the motor boat on the water, offered all the facilities of the motor car, and was speedier than either.



PASSING A PYLON AT HENDON AERODROME.—From an original drawing by Mr. Roderic Hill.

MEN OF MOMENT IN THE WORLD OF FLIGHT.

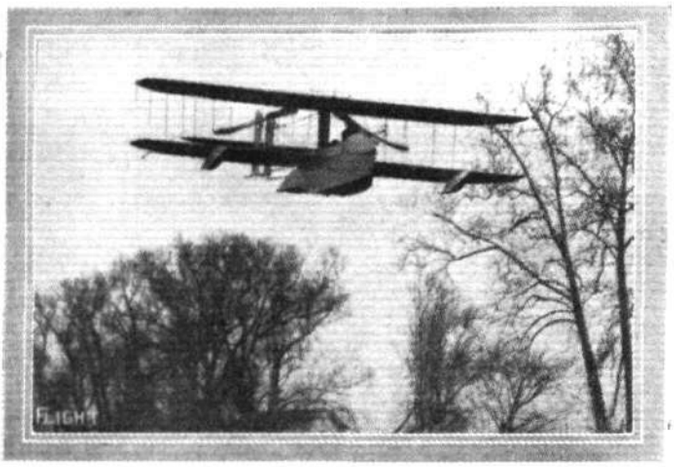


Top row: Sergts. Kemper, Kesszler, Mead, Borne, Mullins, Neathy, Hatchett.
Second row: Sergts. Aspinal, Smith, Baxter, Jillings, Combold, Felsted.
Third row: Sergt.-Maj. Fletcher, Lieut. MacLean, Capt. Tucker, Capt. Becke. Maj. Burke, C.O., Capt. Longcroft, Capt. MacDonell, Lieut. Harvey, Sergt.-Maj. Measures.
Sitting on ground: Lieuts. Dawes, Martyn, and Capt. Waldron.

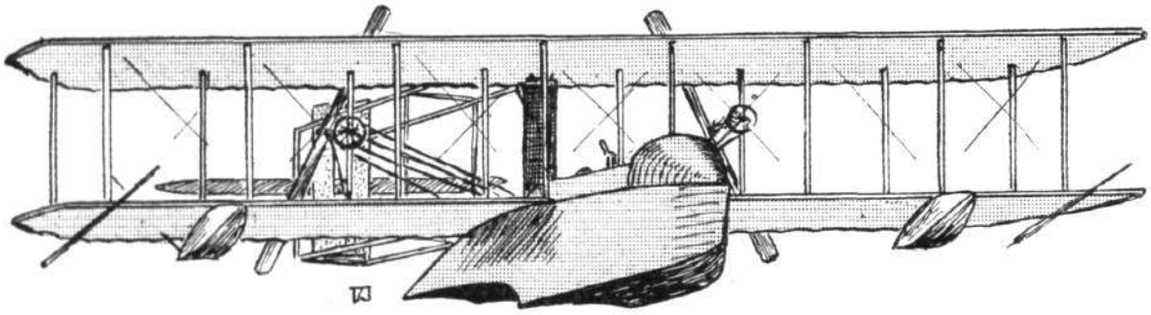
OFFICERS AND N.C.O.'S OF SECOND SQUADRON, ROYAL FLYING CORPS, STATIONED AT MONTROSE.

THE 60 H.P. WRIGHT AERO-BOAT.

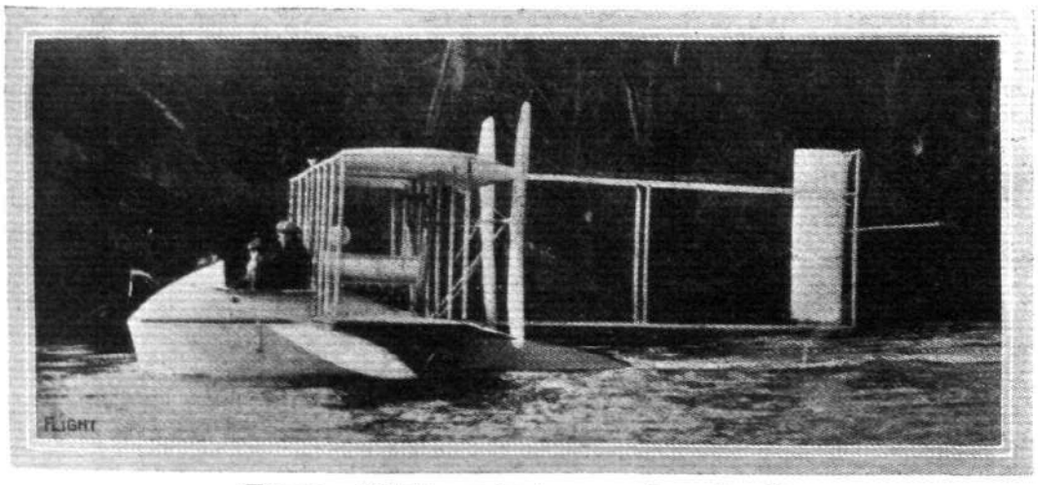
THE popularity of the "flying-boat" type of hydro-aeroplane in America is emphasized by the fact that the Wright Co. has now listed a machine of this type, known as model G. An interesting point in connection with this machine is that it is the result of the collaboration of two pioneers : Orville Wright, of course, being responsible for the aeroplane, while Grover C. Loening—one of the earliest experimenters with the flying boat—has contributed his share of the design in respect to the latter. Although this new Wright model is of the flying-boat type, it really possesses one or two of the characteristics of the single-pontoon type of machine—like, for instance, the Wright hydro-biplane described in FLIGHT for September 6th last. It is, in fact, a combination of both systems, possessing, it is claimed, the advantages of each without the disadvantages of either. This will readily be appreciated by a glance at the accompanying scale drawings, for it will be seen that the boat differs from the usual type in that, instead of stern-tapering to the tail planes, it is comparatively short, like a pontoon, yet at the same time the seaworthiness of the boat system is retained and the tendency of the pontoon to dive under water is reduced to a minimum. Again, the pilot and passenger are not in such close proximity to the water as in other boats, for they sit on the deck and are thus in a somewhat safer position in case of the boat being swamped by a wave. The boat consists of an alloy metal hull, built up on a strong wooden framework. It is 18 ft. long, with a maximum depth of nearly 3 ft. and a beam amidships of 3 ft. 7 ins. The bow is pointed and the stern tapers to a horizontal knife-edge. It is fitted with a single hydroplane step and the curvature of both fore and aft surfaces has been very carefully worked out. The boat is divided up into six watertight compartments and weighs, complete with engine-bed, seats and "cabin," only 305 lbs. The outer surface of the metal hull is specially treated to resist the action of sea water, &c. Two auxiliary floats, also of metal, are mounted on the leading edge of, and below the lower planes, one on either side of the boat, midway between the latter and the wing-tips. Mounted on the deck of the boat amidships are the main planes and the engine, and just forward of the leading edge of the lower plane are the two seats for pilot and passenger, side by side, whilst right in front is a cowl forming a cockpit. The main planes, as with the rest of the aeroplane component, follow the usual design of the Wright land machines, being built up of hollow spars and spruce ribs, the front spars forming the leading edges. Extending back from the rear spars is the orthodox Wright tail outrigger carrying a flexing elevator, somewhat larger than usual, mounted in front of which are the twin rudders. It will be seen that the engine is not mounted alongside the seats as in former models, but behind them, exactly in the centre of the lower plane. The power plant consists of one of the latest 60 h.p. 6-cyl. Wright motors



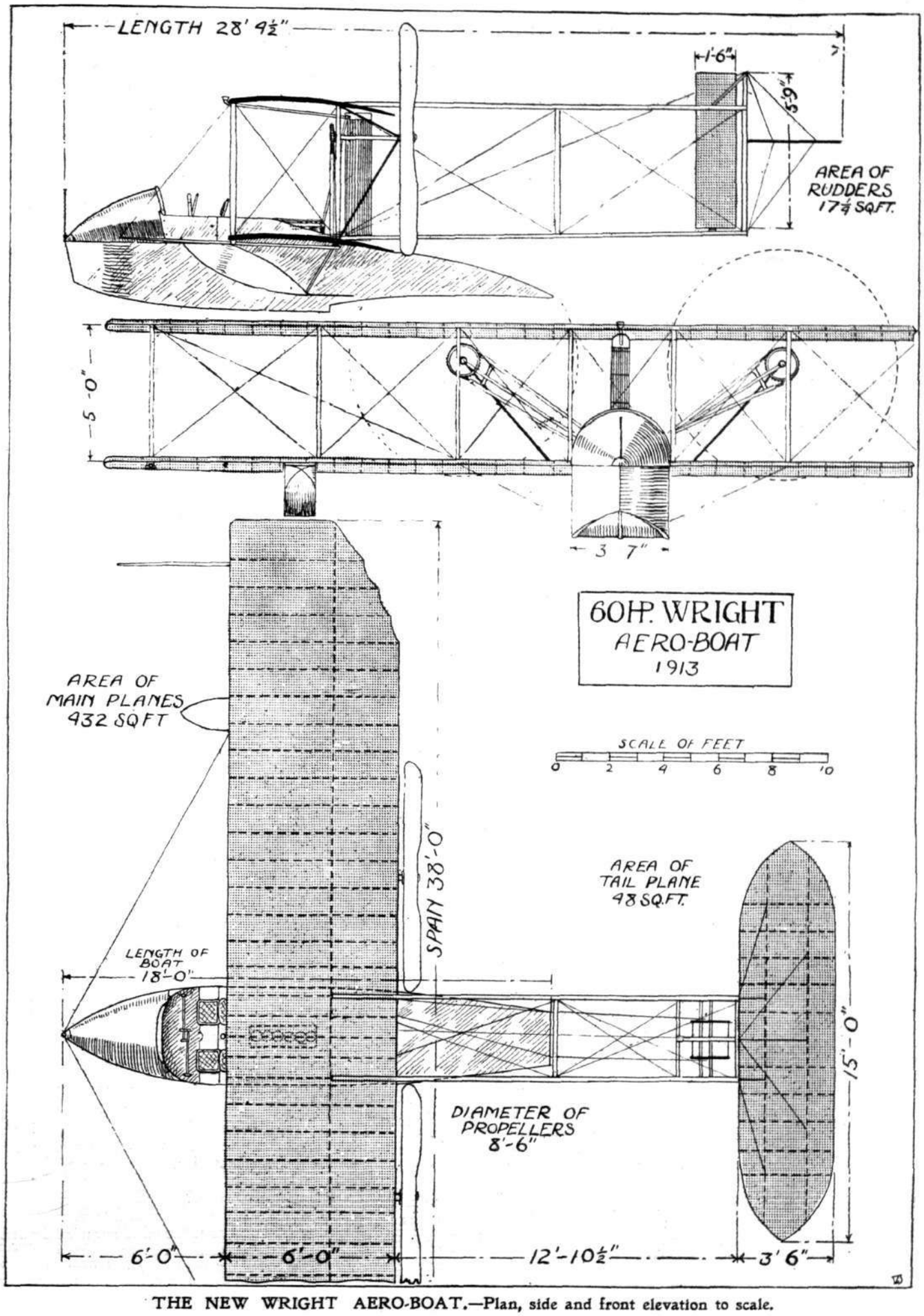
A view of the Wright aero-boat in flight.



Sketch of the Wright aero-boat.



The new Wright aero-boat, as seen from the side.



THE NEW WRIGHT AERO-BOAT.—Plan, side and front elevation to scale.

(water-cooled), 4⅜ ins. by 4½ ins. bore and stroke, which drives a pair of propellers by chains in the conventional style. The propellers are placed a little higher in order to clear the water, and a corresponding alteration has been made to the elevator so that it comes level with the line of thrust. A foot throttle as well as a hand lever on the instrument board is provided for controlling the engine. The engine may be started by means of a hand crank situated just behind the seats, or a self-starter can be fitted if desired, whilst provision has been made for the fitting of a silencer. The machine is controlled in the air from either seat by the usual Wright system of levers, whilst the steering of the machine when hydroplaning is facilitated by two paddles mounted on the lower wing tips and operated from the cockpit. No front "blinkers" are employed, and instead of using a piece of string to indicate the machine's attitude, a small flag is carried by a mast in the bow, which, besides serving its useful purpose, adds to the appearance of the aero-boat. The total weight of the machine empty is 1,200 lbs., and the useful load is about 600 lbs. During the past few months Orville Wright has been carrying out some exhaustive tests with one of these aero-boats with entirely satisfactory results, a speed varying from 38 to 60 m.p.h. being obtained with two up. It rises from the water after a run of not more than 200 ft., and it is very stable in high winds.

AUTOMATIC STABILIZERS.

MR. HENRY M. JULLEROT, Chief Pilot of the Bristol Flying School, Lark Hill, in drawing our attention to an article from the pen of Capt. Bellenger in the *Bulletin mensuel de l'A.G.Ae.*, says that he agrees with the views therein expressed, and thinks that the majority of pilots will do the same. The following is a translation of the article :—

"It is undeniable that pilots are opposed to the use of automatic stabilizers on aeroplanes, and as they do not usually give any reasons for their opposition, the inventors have good cause for accusing them of hindering progress. And yet the pilots are not far wrong. If they do act thus from prudence nobody will blame them, for although experiments with a badly designed stabilizer may enlighten the inventor as to the defects of his device, they will possibly be carried out at the expense of the aviator's safety.

"But there is another cause other than justified cautiousness for the attitude of the pilots. All the stabilizers which I have seen up to the present have been founded on two hypotheses. Firstly that the conditions for stability of an aeroplane, its position in the air, its speed, &c., are invariable during flight. Secondly that the manœuvres to be carried out to bring the machine back to its stable equilibrium depend solely and directly on the disturbance which occurred during the flight.

"But that is not even all. The conditions for stability of an aeroplane vary every instant with the atmospheric conditions. Having its symmetrical plane vertical, its flight path horizontal, and a constant speed, constitute the stable state of an aeroplane for certain atmospheric conditions only, *i.e.*, absence of wind or the existence of an absolute constant wind in the region where the aeroplane flies. But these atmospheric conditions are absolutely exceptional, and to each variation of these conditions corresponds a variation of the stable equilibrium. Sometimes it is best to bank to the right, sometimes, on the other hand, it is advisable to bank to the left. Sometimes the pilot must fly *cabré* and sometimes he must fly *piqué*, or again it may be advisable to increase the speed or to diminish it, and he constantly has to combine all these manœuvres. In other words, there does not exist a fixed stable equilibrium, but there is one corresponding to each particular atmospheric condition. The making of a pilot consists precisely in developing in him that sense of the air which will, at any instant, make him instinctively choose the best attitude. Up to the present it does not seem that this attitude can be determined by absolute and mathematical rules.

"A lengthy experience has taught me that the proper manœuvre to execute in order to right a machine does not depend directly on the disturbance itself, but more on the cause of the disturbance, so that for two precisely identical attitudes taken by the same machine through different causes, the manœuvre required to right the machine differs also. The word 'remous,' which has often been abused for the purpose of masking our ignorance of the matter itself, serves to denote every variation in the movement of the atmosphere, but these variations may be caused either by obstacles on the ground, by local calorific phenomena, by the electric state of certain regions of the air, or by other causes which the future may reveal, and the required manœuvre varies in each case. How can the inert matter which constitutes the automatic stabilizer discern the difference in causes of the identical phenomena? And it is very often a question of life or death. Only a thinking and intelligent being—one acts more often from intuition than from reflection—can discern the difference and consequently modify the action. A thinking, feeling, acting organ—what is it but man?

"Besides it should be noted that an automatic stabilizer, since it is unable to perceive the cause of the disturbance, and is also unable to foresee or anticipate it, does not begin to work until after the disturbance in the path of the aeroplane has existed for some time. It should begin working beforehand in order to diminish the anticipated effect of the cause, and furnish the maximum of correction before the disturbance has reached its maximum. When a boat approaches a wave, does the pilot wait till his craft is careened by the wave before applying his maximum control? No, he measures with his eye the advancing wave, gives his boat the most favourable position, and does almost all his controlling before reaching the top of the wave, that is to say at the moment when the denivellation—the variation in water level—attains its maximum. The same should be done in the air. But, because the air wave is not visible to the eye, our theorists do not see it, and, having never felt it, they deny the pilot, who does feel it, the right to know better than they themselves what is the matter. They consequently impose upon him the use of instruments which, provided they do not work wrongly, certainly have little effect. The result hereof has moreover been proved experimentally: Recently at Juvisy a machine fitted with an automatic stabilizer was flying simultaneously with other machines not so equipped, and all the eye-witnesses can testify that, although the machine fitted with the stabilizer did not require any control by the pilot, it was tossed about much more than were the other machines. How would it have fared in a gale?

"If it is advisable to give the aeroplane such a form that it flies normally in a position which is comfortable for the pilot—with the head upwards most of the time—it is indispensable to leave all the control organs at the disposal of the pilot exclusively.

"Finally, the start and especially the landing involve very delicate manœuvres when the conditions for the equilibrium of the machine, as it changes its means of support, alter radically and rapidly. These manœuvres demand a certain judgment: it is a matter of importance, it will be agreed, whether the flight path becomes parallel to the ground at 10 centimetres or at 10 metres, or that the path of flight meets the ground before becoming parallel to it; and it will also be agreed that the most favourable moment for flattening out is of very short duration in aeroplanes travelling at a speed of 20, 30 or 50 metres per second. Also, and precisely on account of the lack of sentience, the automatic stabilizers must be disconnected when in the vicinity of the ground.

"Also when the machine is far from the ground, and when its attitude is of more consequence for the comfort than for the safety of the pilot—perhaps even for Pegoud, although he finds it very comfortable to fly head down—the most tangible effect of the automatic stabilizer is to increase the fatigue of the pilot and the machine by enlarging the disturbances. When close to the ground—that is to say, when the attitude of the machine is of vital importance—the stabilizer must be disconnected.

"Why then be bothered with such impedimenta? The management of an aeroplane is not a purely mechanical problem, the fixed principles of which allow of attributing an invariable and automatic solution; it is an ever-changing struggle with a very capricious and changeable element—the air; and to follow such an opponent in his feints and tricks requires more than raw material, it requires an organ with alert intelligence, supple and quick, with instantaneous decision—it requires a pilot."

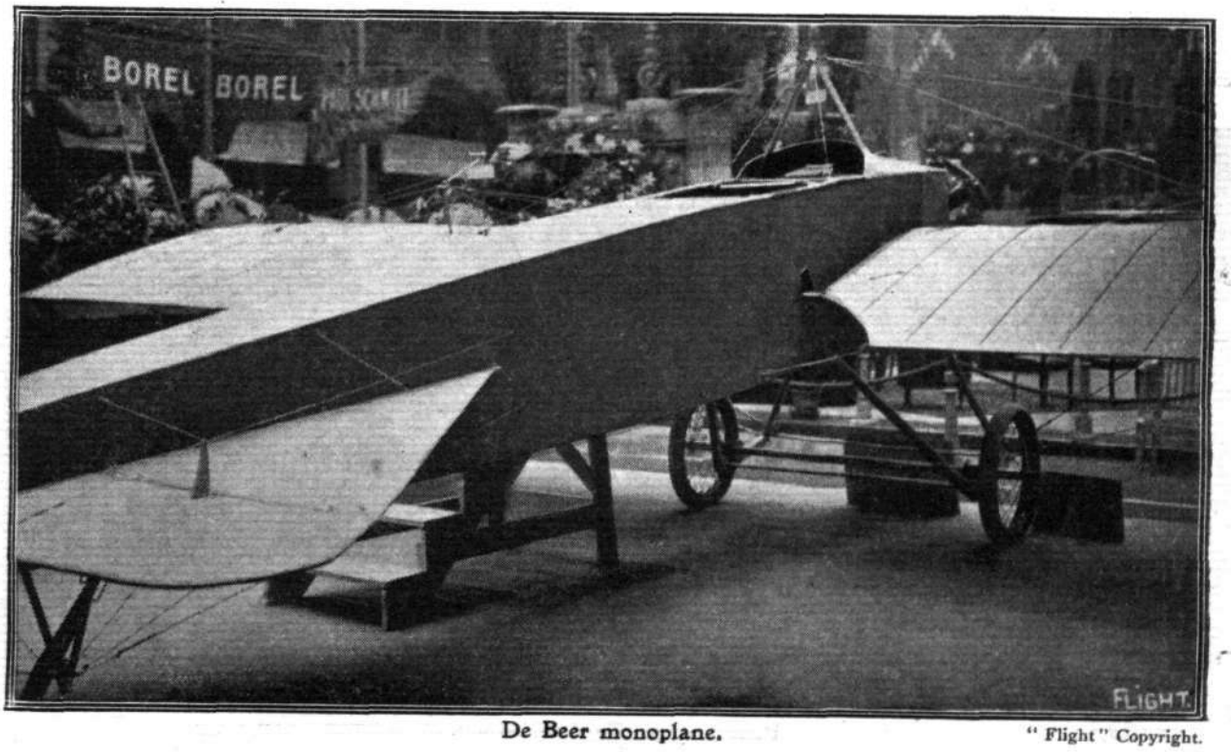
"The Stability of Aeroplanes"

Is the subject of the next lecture before the Aeronautical Society. It will be given by Mr. Leonard Bairstow, A.R.C.S., at the Royal United Service Institution, on Wednesday next, at 8.30 p.m. Sir Alfred Keogh, K.C.B., F.R.S., will preside, and the lecture will be illustrated by experiments with model gliders.

SIXTH ARTICLE.

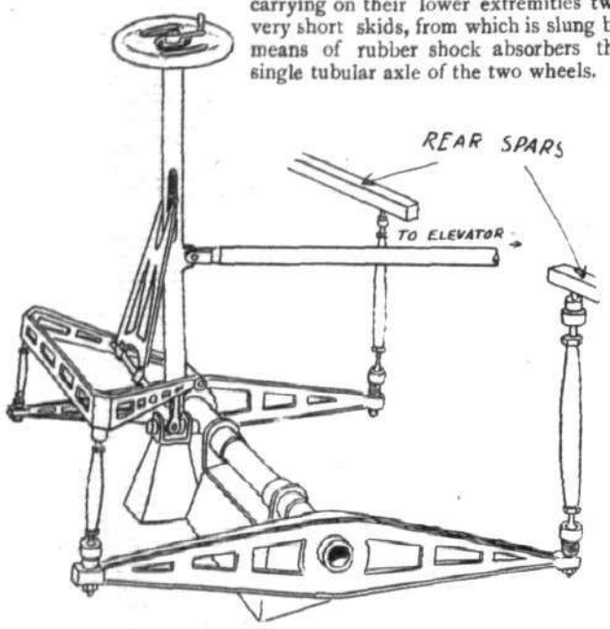
RATMANOFF AND DE BEER.

On the Ratmanoff stand were to be seen two monoplanes, one of which was a Ratmanoff school type monoplane. It is fitted with a 45 h.p. Anzani engine, and the machine itself is built on quite orthodox lines. There is nothing remarkable about the machine, and it is simply a straightforward well-built machine for all-round work, and is sold at the reasonable price of £600. The other machine



De Beer monoplane.

exhibited on this stand has been built by Mons. Ratmanoff to the designs of M. De Beer, and is chiefly interesting on account of the provision made for altering the angle of incidence while the machine is in flight. It is driven by an 80 h.p. Anzani engine, mounted on overhung bearings in the front portion of the *fuselage*. This is of rectangular section, and built up in the usual way of four *longerons* of ash, connected by struts and cross-members of spruce. The chassis is of a very simple type, and consists of two pairs of ash struts carrying on their lower extremities two very short skids, from which is slung by means of rubber shock absorbers the single tubular axle of the two wheels.



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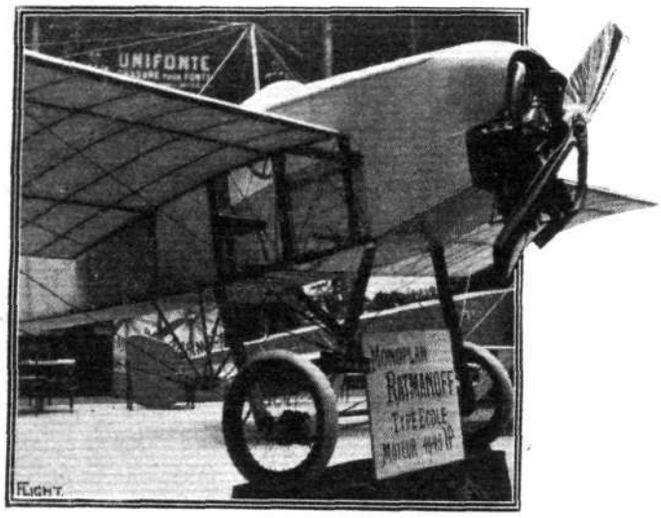
Diagrammatic sketch of the de Beer controls.

Inside the *fuselage* is the pilot's seat, from where he controls the machine by means of the control lever shown in one of the accompanying sketches. The main planes pivot round the front spar, which consists of a steel tube running right through from tip to tip, and is mounted on the *fuselage*. The two rear spars project slightly inside the *fuselage* covering, where they are secured to the system of control levers by which the angle of incidence is altered. By pulling the control lever back, the angle of incidence is increased, thus giving greater lift and causing the machine to climb, while a forward movement of the column decreases the angle of incidence, thereby causing it to descend. A side to side movement increases the angle of incidence of one wing and decreases the angle of incidence of the other, so that this operation takes the place of the warp. The elevator is connected up to the control lever, and works in conjunction with the main planes.

One point in the construction of this arrangement is open to criticism: the two rear spars are simply cut off just inside the *fuselage* covering, and no provision has been made for taking the compression due to the drift, which consequently has to be taken entirely by the bracing cables of the front spar. Otherwise the system appears to be quite good, although the desired object might be obtained in a somewhat simpler way.



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The Ratmanoff monoplane.

PONNIER.

The two Ponnier monoplanes exhibited were evidently built for speed, one of them being similar to the monoplane flown by Emile Vedrines in the Gordon-Bennett race. This machine was fitted with a 160 h.p. Gnome engine, carried between double bearings, of which the front one was easily detachable. The chassis had been reduced to its simplest possible form, consisting of two pairs of V struts of streamlined steel tubes, carrying a single axle on which are mounted the wheels. No provision whatever had been made for springing these, so that the machine must be very tricky to land on anything but the smoothest of surfaces.

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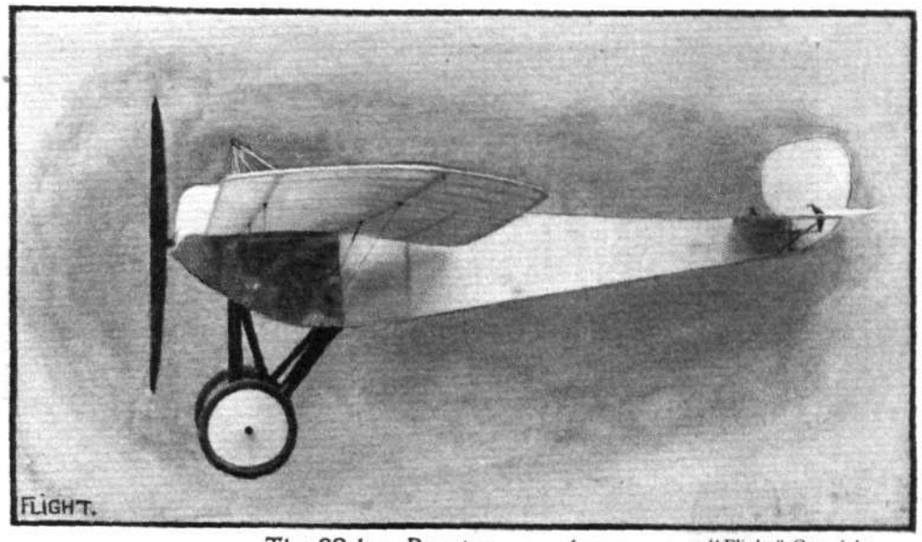
CHASSIS AND ENGINE HOUSING OF THE 60 H.P. PONNIER.—On the right the nose of the 160 h.p. Ponnier-type Gordon-Bennett.

The other machine, which was similar in general lines, was fitted with wings of much bigger span, and the chassis was of a more useful type, the wheels being sprung in the usual way by rubber shock absorbers.

Constructionally the two machines consisted of a very deep *fuselage* built up of four *longerons* of ash, connected by struts and cross-members of spruce.

The method of joining these to the *longerons* was such that the *longerons* are not weakened by piercing. The tail planes are built up of steel tubes.

The upper stay-wires of the wings were attached to the top of a triangular pyramid in such a manner that they could be quickly dismantled, and the lower lift-wires were secured to a quadrangular pyramid, which was independent of the landing chassis. Control was effected by a single hand-lever for warp and elevator, and a foot-bar for the rudder. One gathers that in the future the Ponnier monoplanes will probably be built of steel throughout, so that this firm must now be added to the ever-increasing list of aeroplane manufacturers who favour steel as a material for aeroplane construction in preference to wood.

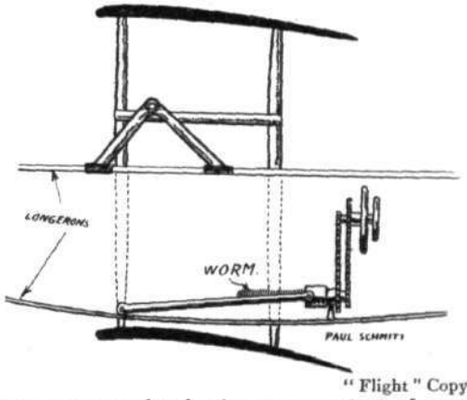


The 60 h.p. Ponnier monoplane. "Flight" Copyright.

PAUL SCHMITT.

ON the same stand as the Morane-Saulnier monoplanes, but forming a separate exhibit, was the Paul Schmitt biplane, the most interesting feature of which was the provision made for altering the angle of incidence. This machine, which was built of steel throughout, was fitted with a 14-cyl. 160 h.p. Gnome engine, mounted on double bearings in the front of the *fuselage*. The *fuselage*, which was built up of steel tubes, was of rectangular section in the front portion, gradually tapering to a triangular section at the rear. In front of the main planes was a very roomy cockpit containing the passengers' seats, which were placed side by side. Access to this cockpit was gained through a door in the side of the *fuselage*, and the spacious cockpit reminded one more of a motor car than of an aeroplane. The pilot's seat was situated out behind the main planes, and in front of him were the two wheels by means of which the angle of incidence could be altered while the machine is in flight, as well as the ordinary control levers, which consist of a single central lever for *ailerons* and elevator, and a pivoted foot-bar for the rudder. It is, perhaps, a debatable point whether it is of any great advantage to be able to vary the angle of incidence during flight, and practical tests of this machine will therefore be of great interest. From the accompanying diagrammatic sketch the principle of the system employed for varying the angle of incidence will be easily understood, and the method of carrying it out appears to be a mechanically sound piece of work.

The range of variation in the angle of incidence is from 0 to 12 degrees, and the wings may be moved through that arc in the space of a few seconds. By increasing the angle of incidence and at the same time throttling down the engine, the minimum speed is obtained, while decreasing the angle of incidence and opening out the throttle increases the speed of the machine. The chassis, which was built up of steel tubes throughout, was of the wheel and skid type, the four wheels being carried on a single axle sprung from the skids in the usual way by means of rubber shock absorbers. The tail planes consist of a large balanced elevator and a divided rudder, no fixed tail plane being fitted. A pivoted tail skid protects the tail planes against contact with the ground.



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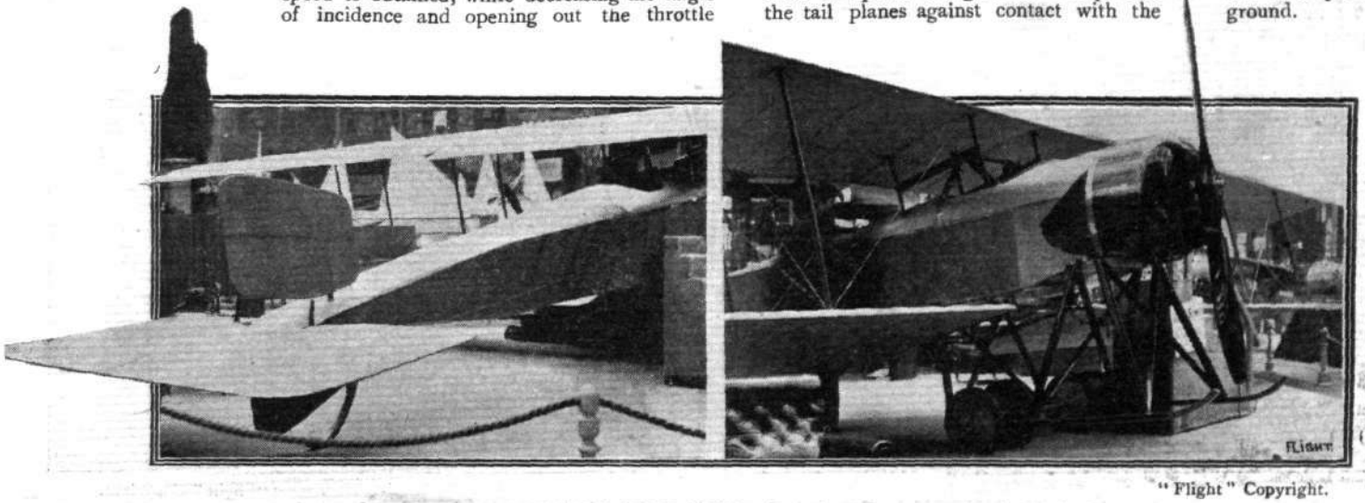
Diagrammatic sketch showing method of altering the angle of incidence in the Paul Schmitt biplane.



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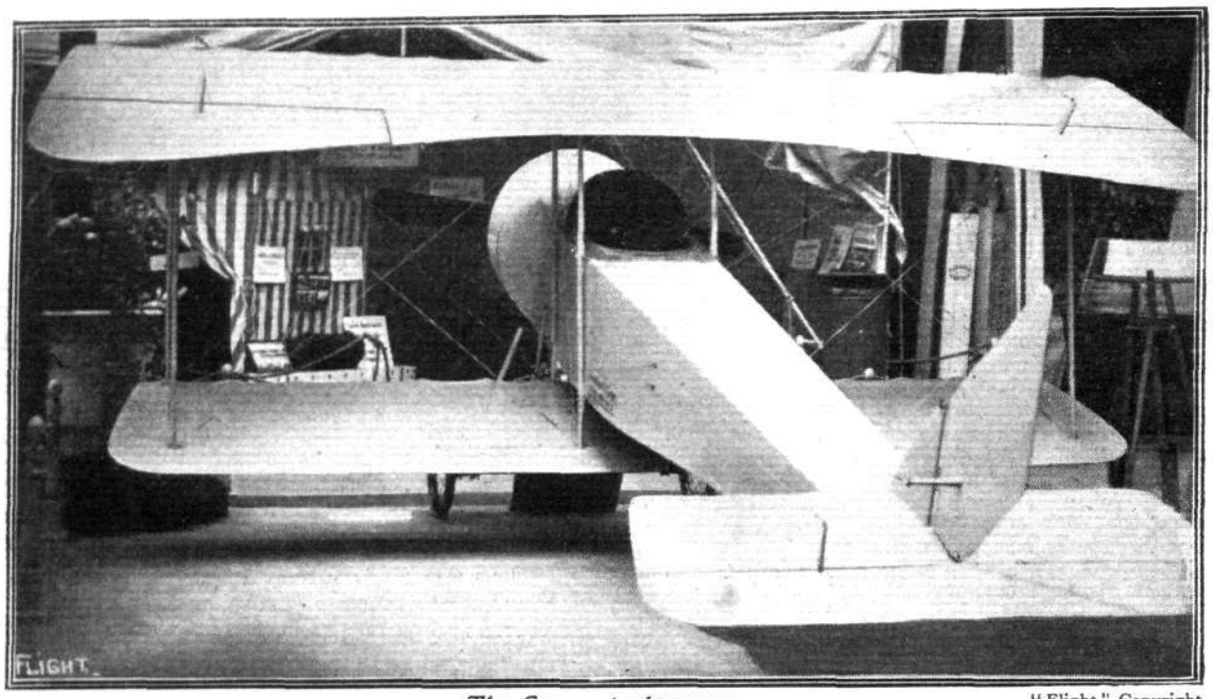
THE PAUL SCHMITT BIPLANE.—On the left are seen the tail planes.

GOUPY.

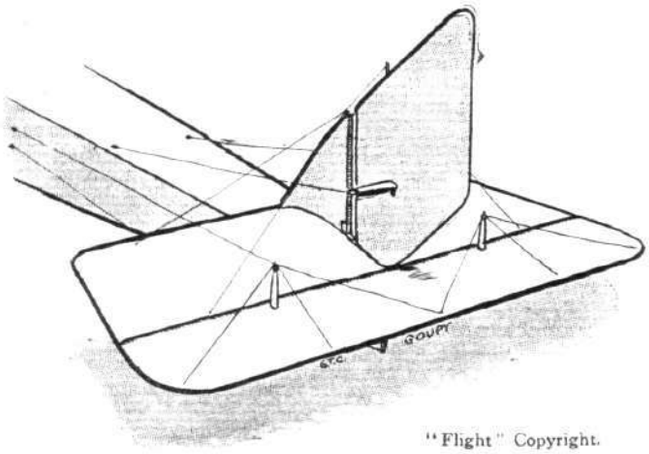


The Goupy single-seater. "Flight" Copyright.

It was a little disappointing, especially in view of the fact that at one time these machines seemed to be full of promise and did some fine performances, to find that the Goupy firm was among the very few firms who apparently had made no progress since the previous Paris Show, when, it will be recalled, a three-seated hydro-aeroplane was exhibited.

Of the two Goupy machines on view, one was a three-seater biplane with the seats arranged one behind the other. It had the usual staggered Goupy planes, but *ailerons* have been fitted instead of the pivoted wing-tips formerly employed on these machines. The engine, a 9-cyl. 100 h.p. Gnome, was mounted on overhung bearings in the nose of the *fuselage*. The chassis, which was of the wheel and skid type, did not look any too strong for its work, and could, one would think, easily be improved.

The other machine shown was a small biplane of almost ridiculously small span. In its general appearance it was very similar to the three-seater, but it was, of course, very much smaller. It was driven by an 80 h.p. Gnome engine, mounted on similar bearings to those of the big machine, the cowl covering it being shaped to form the nose of the *fuselage*.



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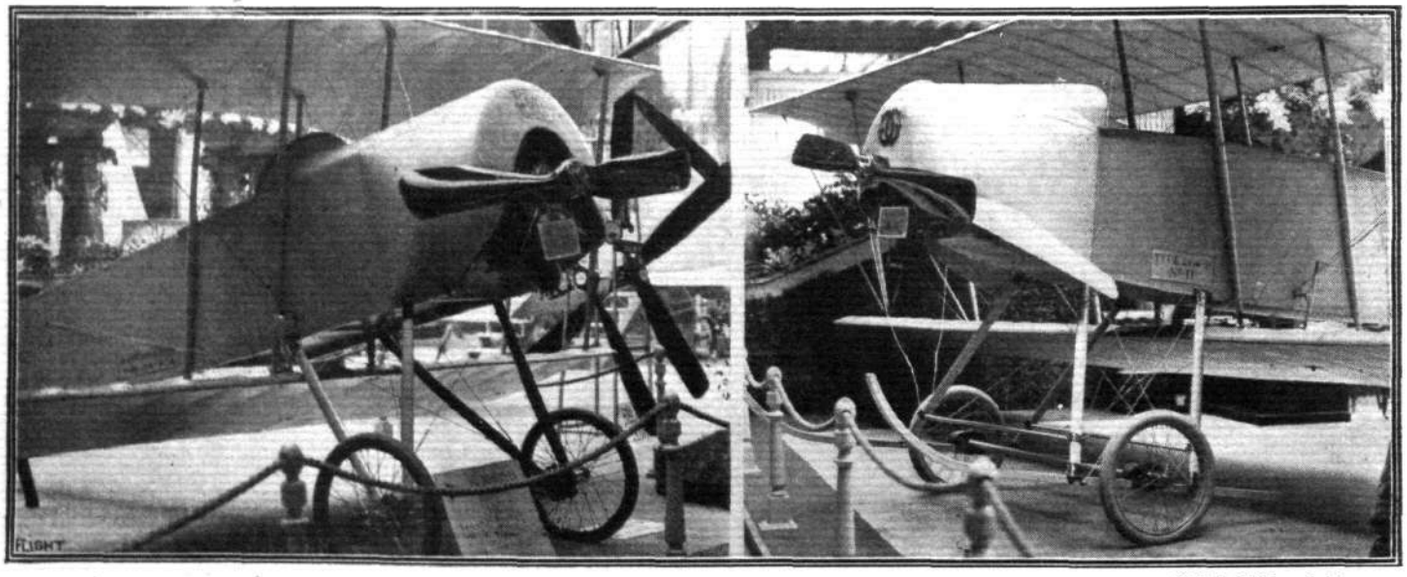
Tail planes of the Goupy biplane.



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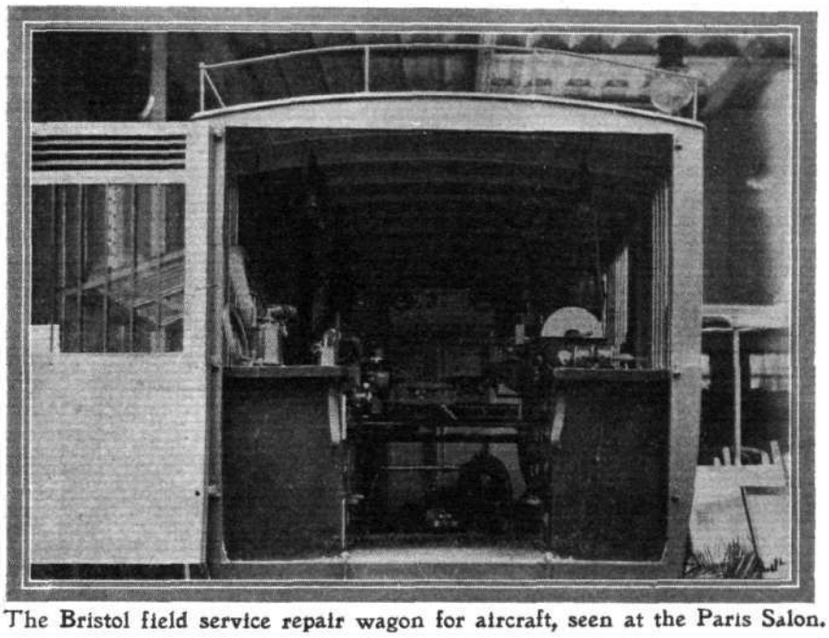
CHASSIS AND ENGINE MOUNTING OF THE GOUPY SINGLE-SEATER.—On the right the tandem-seater Goupy biplane.

FLIGHT

THE BRISTOL REPAIR WAGON AT THE PARIS SALON.

WITH the increased use of the aeroplane for military purposes, the repair wagon, with its necessary outfit of machinery, and its staff of mechanics, becomes an absolute necessity, and quite one of the best we have seen so far is that of the British and Colonial Aeroplane Co., Ltd., exhibited at the Paris Salon. Its motor is one of 30–35 h.p., and it was built entirely by the Company themselves at their works in Bristol, and ran the land portion of the journey to Paris under its own power, giving not the slightest trouble on the way. Driven direct from the engine is a generator which provides the power to drive all the machinery and provide the inside and outside lighting, though when not running the lighting system, which is a Lucas, may be run off accumulators fitted in a most convenient and get-at-able place in the interior of the van.



The Bristol field service repair wagon for aircraft, seen at the Paris Salon.

Quite a feature of this workshop is that the whole of the machinery can be kept running whilst the wagon is travelling on the road at a speed of six to eight m.p.h., which speed, it has been found, is about the limit that can be attained when work is in progress, taking into consideration that men working at the machines must not be jolted about too much.

Every machine is fitted with its own motor, and is governed by an independent cut-out, so that it is impossible to switch on the current at the main switchboard with any of the machines under load.

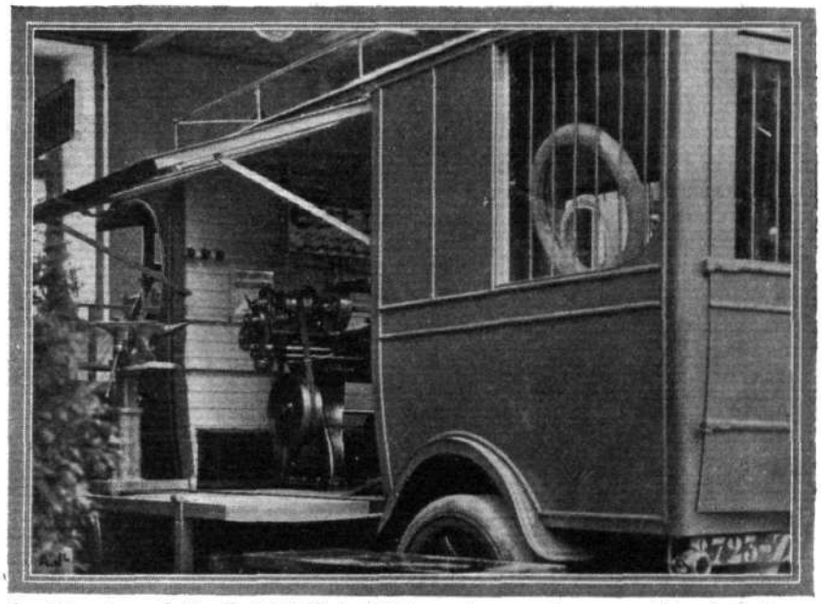
The machines comprise a lathe, bandsaw, drilling machine, electric hand-drilling machine, which is portable and can be taken outside the van at the end of a good length of flexible cord, hand-shaping machine, grind stone, fitters' and carpenters' benches, with vices and tools, fitters' furnace and anvil, together with all tool chests and drawers, fitted out with partitions for spare parts. Under the chassis, at the back of the van, is a very fine winding gear, which can be used whether the van is travelling or not. It is of great power, and is capable of pulling the entire van out of a ditch or soft earth should the wheels sink in, and if an anchorage can be found to fix the end of the cable to. Both sides of the van are half-glass, and are divided at the forward half, so that the bottom may be let down to form a platform, whilst the upper half goes up to form a roof, thus greatly increasing the available working space when the van is stationary. The petrol capacity is 40 gallons. Total weight with all machines and tools on board is about 6½ tons; speed 12 to 15 m.p.h. The motor is fitted with an automatic governor, which cuts out at 900 revs. The price of the vehicle complete is £1,500, which, considering the amount of machinery included, is remarkably inexpensive.

Subsequent to the Show, the vehicle returned under its own power, so far as the land portion of the journey was concerned, to Bristol and the following "log" of the trip gives some details as to the behaviour of the wagon on the road:—

"We left the Grande Palais at 5.15 p.m. on Saturday (December 27th), and proceeded *via* the Champs Elysees to the main road to Saint-Germain-en-Laye. No difficulty whatever was experienced in driving the wagon through the streets, which at that time were crowded with motors vehicles of every description. The road for some eight miles after leaving the Porte Maillot, was in a very bad state of repair, it being practically full of holes six and even eight inches deep and about a foot square, but thanks to the excellent suspension of the wagon, no undue vibration or shock was felt.

"The town of Saint-Germain-en-Laye (famous for the architecture of its castle and church) was soon reached, and here the wagon was garaged for the night, it being our intention to start away at daybreak the following morning and complete the journey to Le Tréport the same day. This, however, proved to be impossible, as at 6.30 a.m. on Sunday, the muddy roads of the previous evening were carpeted with snow to a depth of three inches, the snow still falling. A start was, however, made at 6.45 a.m., but it was soon apparent that to proceed would have been decidedly dangerous, as it was impossible to distinguish the road from the ditch, and the attempt for that day was therefore abandoned. The weather did not improve during Sunday, and when the snow ceased falling at mid-day, it commenced to freeze, and at 8 a.m. on Monday, the snow was quite hard and showed no signs of clearing away.

"We again left Saint-Germain, and proceeded through the magnificent St. Germain Forest, where the trees, thickly covered with snow, were a very impressive sight. We soon arrived at the town of Pontoise, where we found that for a few miles the roads had been cleared by snow ploughs, but this impeded rather than facilitated our progress on account of the ploughs only clearing a narrow passage of about three feet, with the result that the wheels of the wagon were running through the banks of snow nearly a foot deep caused by the plough.



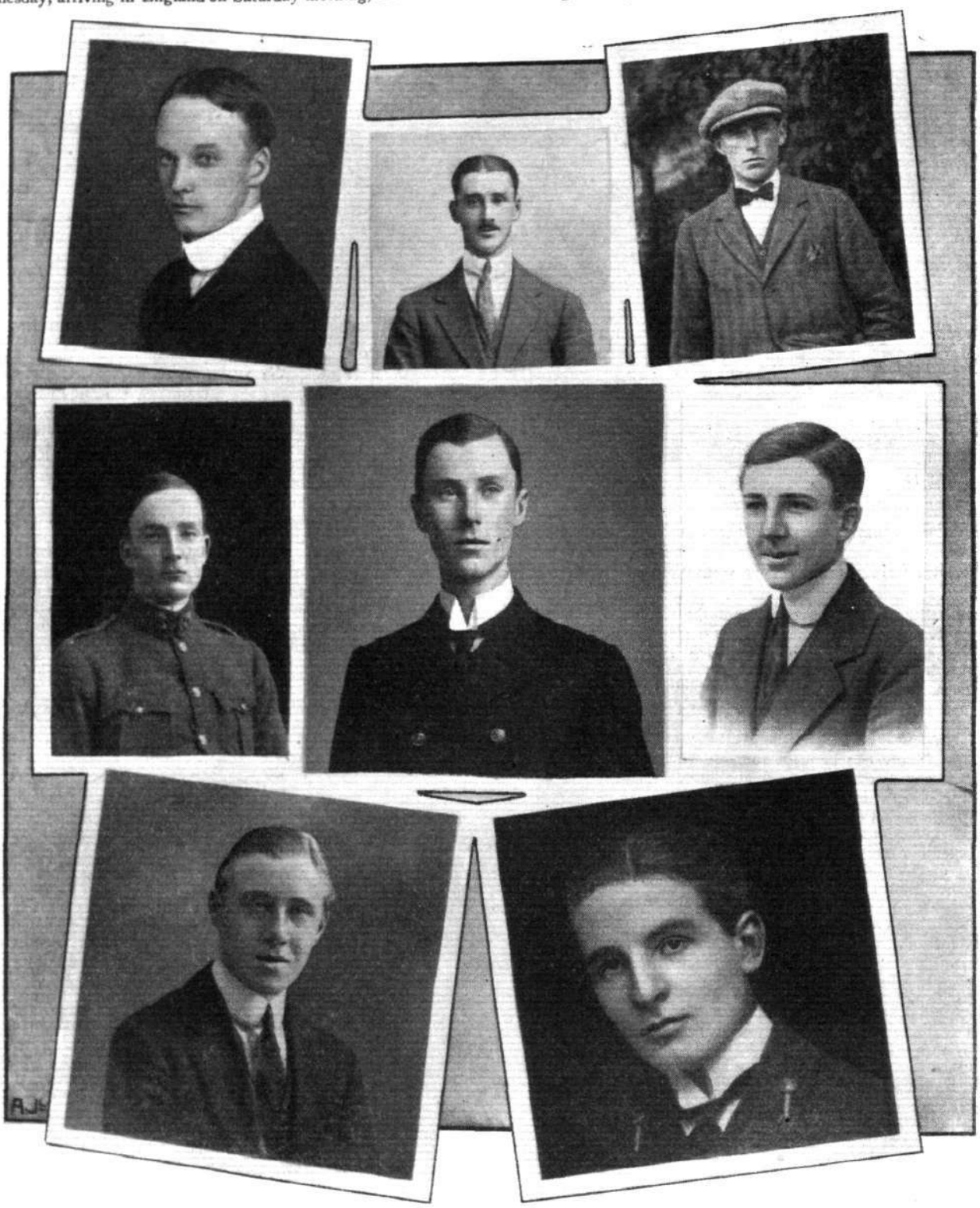
A side view of the Bristol Co.'s field service repair wagon for aircraft at the Paris Salon.

"Passing through the village of Méru, we were soon on the way to Beauvais, a historical town of considerable size and importance, and the journey then proceeded without incident through Marseilles-le-Petit to Grandvilliers. The road between Méru and Grandvilliers was exceptionally hilly, as was in fact the whole journey, but this particular section contained a hill fully two miles long in the form of a double 'S,' on which the frozen snow did not provide the best surface for the wheels to grip. In several places we ran into

snow drifts nearly two feet deep, but the wagon steadily made its way through these.

"The night was spent at Grandvilliers, and on Tuesday morning we started from there at 8 a.m., arriving at Aumale at 9.15 a.m. where we picked up the River Bresle, which was followed through Gamaches and Eu, until Le Tréport was reached.

"The wagon was put on board the boat for London on Wednesday, arriving in England on Saturday morning, and the road journey from London to Bristol was accomplished without incident. The average speed of the motor wagon on the French roads was 12 miles per hour, which was a very creditable performance, considering the state of the roads and the heavy running occasioned by the several snowstorms. The 35 h.p. motor worked splendidly throughout the run, and, to sum up, this travelling motor workshop is excellent testimonial to the quality of the construction at the Brislington shops of the Bristol Co."



Reading from left to right, top row: Lieut. E. D. M. Robertson, R.N., Lieut. C. E. R. Bridson, Sub-Lieut. G. R. Bromet, R.N.

Middle row: 2nd Lieut. G. H. Broadhurst, R.F.A., Sub-Lieut. F. G. Saunders, R.N.V.R. (who on January 1st was first to take his ticket at Brooklands under new tests), Mr. Ian C. Macdonell.

Bottom row: Mr. J. L. Finney and Mr. Don, R.N.

Some pilots who have recently passed the qualifying tests for pilots at the Bristol Flying School, at Brooklands under the tuition of Mr. F. Warren Merriam. Altogether Mr. Merriam has now put through nearly 100 pupils, most of them being army and navy candidates, and without a single accident which could be really called serious. In regard to his own mishaps, about the only one Mr. Merriam has had during his work at Brooklands was when he took his turn at the Sewage Farm, owing to his engine petering out.

EDDIES.

THE persistent bad luck attending Count Zeppelin and his airships, has in no way discouraged the German authorities, and more ships are to be built. The engineers and workmen in the Friedrichshafen factory on lake Constance, are busy constructing five more Zeppelins of various sizes, all of which must be ready by April next. Two of these are intended for the army and two for the navy, the fifth will remain at Friedrichshafen for experimental purposes and passenger carrying. Whether airships will or will not be of such great service as anticipated in any coming warfare remains to be proved, but one cannot help admiring the pluck and persistency shown by the German nation in the face of terrible misfortune.

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The Navy have a way of getting hold of good pilots, somehow, and I was reminded of this when I saw that Rainey—or Lieut. Rainey, as I suppose I must call him now—put up his record climb last week; 1,200 feet in 58 seconds with "all aboard"; but then, everybody who saw Rainey at Eastbourne knows Rainey. I have read somewhere that the best way to disable airships will be to get a pilot on a monoplane to fly right into one. It went on to say that of course this meant destruction to the pilot, but that we should have no trouble to find men to do it. Just so! If Rainey is anywhere about just then—well, I know Rainey.

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It's a pity aviation cannot boast a few more sportsmen like Frank McClean in its ranks. Possessed of a fair share of the stuff that makes the world go round, and with a huge interest in all that pertains to aviation, either in his own interests or the interests of others, he has probably done more for the advancement of flying than any other single individual. In the very early days he obtained possession of a large tract of land in Sheppey, round about Eastchurch, which he made over to the Royal Aero Club at a mere peppercorn rent as a practice ground. It would not be wrong either, I think, to call him the father of the Navy flyers, for he it was who at his own expense bought and placed machines at the disposal of the Admiralty to enable the first quartette of naval pupils to be trained at Eastchurch, when the Navy had not a single machine for them to learn on.

A very reticent man, so far as his own good deeds are concerned, he has done more for aviation than most people are aware of, and there is not much doubt that his recent flight up the Nile is as much in the interests of other people as for his own pleasure; nor must we forget his sister, who is frequently his passenger and companion when flying. The enthusiastic private owner is the man for aviation—would to goodness we had more like him.

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The capabilities of the pretty little Caudron biplane are just now being shown to advantage in New Zealand, by the flying of J. W. H. Scotland, who it will be remembered came to England to learn flying at the Hall school at Hendon. He took his ticket in good style, and even in his pupil days showed every promise of becoming a first-class pilot; which promise he now appears to be fulfilling. Being in the lucky position of being able to purchase his own machine, he very wisely chose the make on which he learned, and ordered through Ewen, a Caudron, which was built for him by Hewlett and Blondeau, and was everything that he could wish. A good pilot on a good machine, in a country where flying exhibitions are none too plentiful, he should have little difficulty in getting plenty of engagements, which I am sure he will carry out to the satisfaction of all concerned, not excluding himself.

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There are some things we can do better in England than on the Continent, even in aviation: we don't allow aviators to fly over London, and I am glad of it! I don't at all like the idea that an aeroplane might drop on my head through the roof as I sit writing these notes. Gibert has just had a little mishap whilst flying over Paris, and landed on the roof of a factory. The paper states that no harm was done, except to the roof, and the machine, but wait a bit! I remember once reading about a lady who brought an action—and won it too, for being *nearly* run over by a taxicab. The cab did not really touch her, but it was being driven to the common danger, and the lady fell, and claimed damages for shock to the system, or intellectual and moral damage, or something of that sort. It's all very well for the pilot to appear at the door smoking a cigarette, and no doubt the roof and the machine can be repaired without much expense, but it is distinctly disquieting to the nerves, even of a factory girl, to have a ton or so of aeroplane suddenly appear through the roof to the accompaniment of a shower of falling tiles. Suppose he missed the roof and fell on a motor 'bus?


Shock to the system

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Although I write these notes every week, I know nothing about aeroplanes, as you may already have guessed, in which case this little apology will be unnecessary. I see that yet another inventor is on the track of the uncapsizable aeroplane; in fact he goes further, according to the *Daily Express*, and claims that he has already invented one that cannot capsize. You know, I really ought by rights to be a millionaire now, because almost everything that has been invented, and has brought fortune to its inventor, I had thought of before, and had seen nothing in it; you have probably noticed this yourself. You remember, of course, when you used to wrestle with your collar stud, you knew perfectly well that if the head would only take off, you could get it through much easier—but who bothers with these things? Well, to get back to aeroplanes. This gentleman says he has found that if the stress is put on the undercarriage, and the weight on the wings during flight, the aeroplane will be uncapsizable. There! and I had thought that this was being done all the time—Ah! me; when SHALL I wake up?

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Several papers have been commenting extensively on the expressions of dissatisfaction made by Mr. B. C. Hucks at Moortown, Leeds.

When Pegoud first looped the loop in this country, I took up the position that it was of the utmost importance to aviation from a scientific point of view, but that as a circus performance there was not much in it,

and I have seen no reason to alter my opinion since. At the same time there is sufficient of the thrill in it, to make it inevitable that some pilots would take it up as a show performance, though I think one and all have defended it from the scientific side. This being so, it is a pity Hucks should have so far forgotten himself as to give vent to his feelings as he did. I can quite understand his annoyance in the matter, but it is sometimes better to think a lot and say nothing. Looping the loop must, I think, be taken as representing the march of progress in aviation, which cannot be stayed, at the same time it will go far to make the ordinary spectator become *blasé* rather too quickly with regard to exhibition flying. Hamel seems intent on knocking the bottom out of the whole thing as a special stunt, seeing that he now does it as part of his regular flying, almost every time he goes up. The point is, one can't have one's apple and eat it, and looping the loop will have to, in fact has already, become part and parcel of ordinary flying. It is useless to grumble about people staying outside to see it because it has to be done at such an altitude, that looking the matter squarely in the face, and taking human nature as human nature, there will always be a section of the public who will not pay to see what they can see for nothing. There is probably only one aerodrome in the world where one must pay, or see not, and that is Brooklands, hence the huge crowds to see Pegoud.

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What has become of the bard of Hendon? I haven't seen any of his verses since he made Hamel fly over the moon to the tune of the fiddle. Perhaps the cold weather is keeping him in his sanctum, where he is getting something ready to startle us with in the coming season; anyway, he will have to look to his laurels, because another aviation poet laureate has taken the field. I read the following in *Lloyd's* this week, and incidentally the poet got five shillings for writing it, whereas our Hendon friend publishes his free, for the benefit of mankind generally:—

"Bertie bought a pair of skates, an aviator he;
Exclaimed, 'I conquered A.I.R. so why not I.C.E.?'
He glided off so smoothly, quite thought he'd got the knack,
But cried 'Good Gustav Hamel!' as he volplaned on his back.
Then he tried a sort of spiral, and gave one awful 'Whoop!'
As the chap in front of him collapsed, and Bertie looped the loop.
They brought him round with brandy and took him to the shore,
And as they gently bore him home he murmured 'Nevermore!'."

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The little slip made in last week's FLIGHT, when the wrong inscription (as given by a photographic agency who supplied the photograph, and whose reputation is such that pictures are hardly glanced at for correcting purposes) was placed under the picture of Mr. Gustav Hamel and Miss Trehawke Davies, was noticed when the first copy came from the press, and was instantly corrected. Even so, some few copies were already printed, such is the productive power of modern machinery. We thank those readers who have written pointing out the error, and seeing that we must have had one letter for every two copies wrongly printed, it shows the interest our readers take in their favourite journal, and how keen they are that nothing wrong should be placed on record. The machine was, of course, a Blériot, and the block was only inserted in that number to give readers a picture of Mr. Hamel and Miss Davies together.

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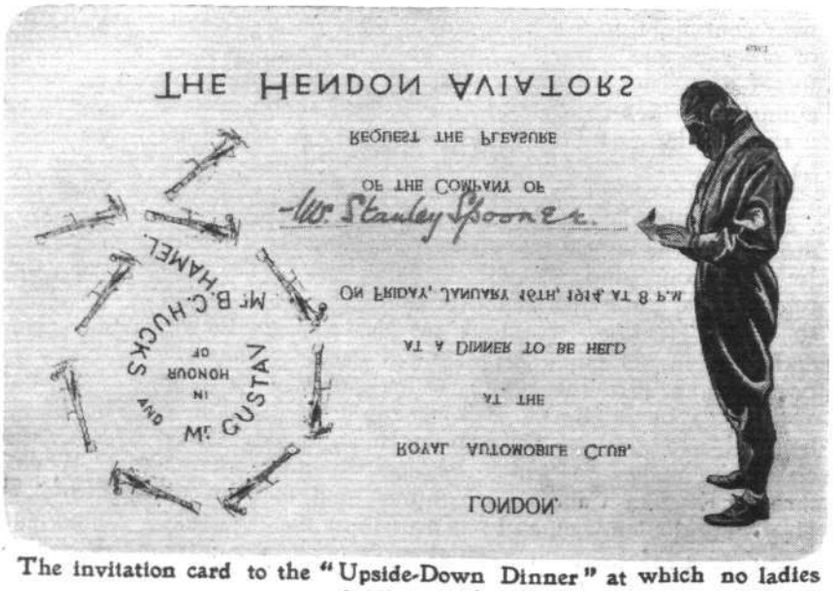
Writing as I do before the event, my first thought is that I should like to be present at the upside-down dinner given to Mr. Hucks and Mr. Hamel at the Royal Automobile Club on Friday. I think it would be very interesting. Everything—almost—is going to be done backwards. "Gentlemen, you may smoke" will be the first item, and soup the last. Mr. Hamel and Mr. Hucks will respond to the toasts of their health before they have been proposed. In fact, everything is going to be topsy-turvy. If the thing is going to be carried out to the letter, there will certainly be some fun. I can imagine, for instance, that they will arrive in their respective cars driving on the reverse. That they will climb the grand staircase backwards, and enter the room on their heads. If there is any real upside-down work to be done, it is possible that it had better be done early in the evening, because when one plays practical jokes with one's inside, things might not be so comfortable later. Of course, it is impossible to carry the thing out properly, after the style we are used to seeing when a film is run backwards, otherwise, it would be most entertaining.

In that case the thing would start with the morning headache, and travel backward through a restless night. The evening-dress suit would pick itself up from various parts of the room and clothe the figure, and the whole thing would be great. I see the tables are going to have legs screwed on above the cloth, and mirrors will be placed so that all will appear to be reversed. No! on second thoughts I am glad I am not going to be present. Sometimes at these dinners, where all goes with a merry swing, it is quite bad enough to get things to look right way up when they are, goodness knows what the effect will be under these conditions. "WILL O' THE WISP."



The invitation card to the "Upside-Down Dinner" at which no ladies were present.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

MONDAY and Tuesday last week no Naval flying.

Wednesday, Commander Samson making some fine flights on S. 3 80 h.p Gnome in the afternoon. Capt. Courtney instructing on the school machine S. 2 50 h.p. Gnome. Lieut. Osmond, from the Grain Station, flying well on S. 65 80 h.p. Gnome.

Thursday, Lieut. Osmond again up on S. 65, Petty Officer Andrew making a long flight on M. Farman 23, Capt. Courtney instructing

Mr. R. E. B. Hunt, who passed for his *brevet* at the Eastbourne Aviation grounds on December 22nd.

on No. 2. While the pilots were up a gale sprang up; though making very bumpy descents, they managed to land without any breakages.

Just before dusk, Friday, Lieut. Davis, R.N., took up S. 65, though the wind was blowing at about 30 m.p.h. After making a couple of very bumpy circuits he landed in a well-chosen spot.

Commander Samson had out No. 3 in the rain and wind, Saturday. Lieut. Davis, on Sopwith 33 80 h.p. Gnome, also in the rain, but flying well at a good height for two or three circuits. In the afternoon there was a lot of flying. Com. Samson on No. 3. Capt. Courtney on Dep. 7 making two fine long and high flights. Lieut. Davis also making high flights on Sopwith 33. Lieut. Osmond on S. 65 had one long trip in the clouds, finishing with a beautiful spiral glide. The M. Farman was up, piloted by P.O. Andrew, making some good flights. Also Leading Seaman Bateman put up a good exhibition on the M. Farman.

Civilian Flying.—On Monday Mr. Gordon Bell was up testing a new Short 100 h.p. Gnome tractor, taking up Mr. C. R. Fairey and Mr. M. Wright. Tuesday he was up again, testing propellers and taking Mr. Fairey up as passenger. Wednesday he was again flying the same machine, taking Mr. Fairey and Mr. M. Wright up together, and the machine behaved grandly with this extra load. Thursday, though an absolute gale was blowing, Mr. Bell again was up, doing some pretty stunt flying, Mr. Fairey again being passenger. In the afternoon Mr. Bell started for the Isle of Grain in hail, rain and wind. While the machine was on the ground there was too much wind for it to answer to the controls, and at a thousand feet it was absolutely unsafe, for even birds were being blown all over the place. Very slow progress was made, as the wind was head all the way, but Mr. Bell persevered and made a safe landing.

Brooklands Aerodrome.

ON Monday and Tuesday last week it was too windy for flying.

On Wednesday both the Vickers and Bristol Schools were busy with their respective pupils. Messrs. Barnwell and Elsdon were out on the Blériot monoplane. Herr Roempler made a number of flights on the D.F.W. biplane, both solo and with passengers. The Martinsyde monoplane was flying well. Mr. Alcock was out several times on Mr. Coatalen's Maurice Farman biplane with the 100 h.p. Sunbeam. Capt. Baird and Lieut. Adams came over from Farnborough on a Maurice Farman biplane, returning to Farnborough after a short stay.

The weather was too bad on Thursday for flying.

Mr. Pixton was flying well on Friday on the No. 8 80 h.p. Gnome-Sopwith biplane. Mr. Barnwell made some interesting firing tests with the gun-carrying Vickers biplane with a passenger, the latter controlling the gun.

On Saturday Mr. Merriam was out on the new Bristol School biplane with Mr. Jacques as a passenger. The Martinsyde monoplane was flying well. Mr. Alcock was further testing Mr. Coatalen's Maurice Farman biplane. Herr Roempler was out on the D.F.W. biplane. Mr. Raynham was testing Mr. Davis's 50 h.p. Avro biplane, at the same time giving tuition to Mr. Davis, who afterwards made some good straights solo.

The wind was very strong on Sunday, and only two machines were out—the Martinsyde monoplane, on which the winner of the ballot, Mr. L. C. Tasho, chauffeur to the Daimler Co.'s hire department, Store Street, Tottenham Court Road, London, and the winner of the previous week's ballot, had their flights, and the Sopwith biplane, Mr. Pixton.

Bristol School.—Monday, last week, no flying in morning owing to wind and rain. Merriam made a flight during the afternoon but found weather too bad for tuition. On Tuesday, weather too bad for flying all day.

Halford testing, with Lieut. Pigott as passenger, Wednesday. Afterwards with Lieut. Cull on straights. Merriam gave two flights each to Lieuts. Watkins, Pigott and Cull for circuits and landings, the pupils having full control. Merriam again with same pupils, after which Lieut. Pigott made his first circuit extremely well, landing perfectly. Lieut. Watkins then made his first circuits in fine style. Lieut. Pigott made five circuits, with very good landings, Lieut. Watkins also doing circuits and landing practice. Lieut. Cull then made his first circuit alone, while Lieuts. Watkins and Pigott were doing figures of eight, the latter pupils landing remarkably well. Lieut. Cull on circuits at 300 ft. and Lieuts. Watkins and Pigott making *vol plané* landings from a good height. Lieut. Cull again on circuits, which finished the morning's work. In the afternoon Merriam tested two new machines, then with Lieuts. Palmer and Binney (new pupil) on straights. Lieut. Watkins then went for the first half of his *brevet*, which he succeeded in taking, flying exceedingly well and landing close to observers. Lieut. Pigott doing figures of eight. Halford finished the day's work with a flight at dusk with Air-Mechanic Locker.

Thursday, Halford testing but found wind too strong, after which another test was made. Merriam took Air-Mechanic Locker on several straights, but the wind springing up suddenly prevented further tuition.

All day Friday weather too bad for flying.

Mr. Norman Howarth, who gained his certificate at the Grahame-White School, Hendon, on December 11th.

On Saturday, after the rain ceased, at 9 a.m., Merriam took Lieut. Binney for a high flight, but found the wind rather bad. He took Lieut. Pigott for a straight flight to give him experience in flying in a wind. Halford gave two flights to Lieut. Binney, but the wind was too bad to continue. Tests were made during the afternoon, Merriam taking Mr. Racine Jacques as passenger, but the weather was not good enough for tuition.

Vickers School.—Monday, last week, Barnwell on gun-carrying biplane, with passengers.

Messrs. Elsdon, Barnwell and Knight on biplanes, Wednesday, instruction to Messrs. Crosbie, Creagh, Dawson and Monckton. Mr. Creagh solo. Mr. Webb solo on No. 5 mono.

Thursday, Instructors Knight and Elsdon on biplane with Messrs. Crosbie and Monckton, and Friday, Barnwell testing gun-carrying biplane, with passenger.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—The weather was very bad nearly all last week for pupils, but on Wednesday Messrs. Norris, Carr, Cripps, and Lillywhite made solo circuits, and Mr. Parker circuits with Instructor Manton. Messrs. Piercy, Cowly, Parker, Bjorkland, Moor, Strange, North straights with Instructors M. D. Manton or L. A. Strange in passenger seat. Afterwards Mr. Bjorkland solo straights.

W. H. Ewen School.—During the past week weather conditions have been unfavourable, and in consequence there has not been much out-door practice by the pupils at the W. H. Ewen school. On Wednesday, however, M. E. Baumann, after a test flight on the *brevet* machine, had out Messrs. Macgregor and Cooper, both flying good half-circuits, Mr. Murray was doing good circuits, and practising landing from 50 ft. with engine off. In the afternoon the same pupils were out again for some time, all doing well.

Under the instruction of Mr. F. W. Goodden, Lieut. Kinnear was doing good straights, and Mr. Busk was rolling.

For the rest of the week, tuition was confined to practical work in the hangars, though M. Baumann on the 60 h.p. Caudron two-seater and Mr. Goodden on the 45 h.p. biplanes put up some good exhibitions in high winds.

Hall School.—A gale stopped flying Monday and Tuesday last week. On Wednesday, Mr. Hall flying ¾ hour at high altitudes on No. 1 Caudron, executing a spiral descent with propeller stopped from 1,000 ft. Very strong wind Thursday, and a gale Friday. J. L. Hall ten minutes in afternoon, very bumpy. Saturday, Denys Ware out in early morning with pupils Brookes and Burn, but on testing air found conditions too windy for school practice. J. L. Hall exhibitions in afternoon, but engine not pulling well owing to oil not running freely. New double-surfaced Caudron nearing completion.

Salisbury Plain.

Bristol School.—The weather during Monday last week was very bad, and no flying took place during the morning. At 3.20 p.m. Busteed arrived from Bristol on the 80 h.p. Bristol tractor biplane, taking 26 mins. for the journey, *i.e.*, a speed of nearly 90 m.p.h. Busteed then gave flights on this machine to Mr. Voigt and Mr. Stutt.

Busteed and Voigt each made flights Tuesday to test conditions, but owing to the strong wind no tuition was possible.

Busteed behind Mr. Stutt for two flights Wednesday; this pupil then making his first solo, in the course of which he did two large circuits flying very well. Busteed then took Mr. Stutt for a trip on the 80 h.p. tractor. Mr. Gilligan made two good solos on biplane. Jullerot testing on biplane and tandem monoplane. Mr. Gilligan and Mr. Stutt each did three solos. Jullerot then out on 80 h.p. tractor. Voigt gave further landing practice to Mr. Stutt, this instructor then finishing up with a high flight on the biplane.

Thursday, the weather during the morning was unfit for tuition, and in the afternoon Sippe made a short flight in 80 h.p. tractor, but found weather still unsuitable.

The wind and rain on Friday morning prevented tuition, but in the afternoon Sippe went out on the tractor with Voigt as passenger, but was compelled to return, running into clouds at 500 ft. The wind was then blowing at about 35 m.p.h.

Saturday, too windy for tuition in morning. In the afternoon Jullerot gave tuition to Captain Fell and Lieut. Finch, but the weather was unfavourable.

Shoreham Aerodrome.

THE weather last week did not allow of much work being done, though the best was made of what calm weather there was. All of the pupils have been out, and Lieut. Clemson and Mr. Purnell are now doing very good straights on the 45 h.p. Green-Avro.

Mr. R. P. Cannon has made splendid progress, and has done a number of good circuits at a good height. He is now nearly ready for his "ticket." Mr. William H. Elliott, who was the instructor for the week, has done a lot of very good flying on the 45 h.p. Avro, doing a number of remarkably good banked turns. Messrs. V. W. Eyre, A. Maskall, and R. P. Maskall (new pupils) are now on the rolling stage.

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FLYING AT HENDON.

THE January Meeting at Hendon last Saturday was held under very unpleasant weather conditions, for besides being very cold, a drizzling rain fell off and on during the afternoon, and it was also very misty, which did not improve matters so far as the cross-country handicap—the principal event down on the programme—was concerned. The proceedings were opened with a splendid exhibition flight by Marcus D. Manton on the twin-rudder G.-W. 'bus. Manton's exhibition consisted of his usual neat spirals, zig-zags, &c. Other Hendon pilots came out on their machines immediately after and put up numerous exhibition and passenger flights. These pilots were F. Goodden on the 45 h.p. Caudron, Pierre Verrier and R. H. Carr on Maurice Farmans, R. Lillywhite—the New Year pilot—on the 50 h.p. G.-W. 'bus, Philippe Marty on the 50 h.p. Morane-Saulnier, J. L. Hall on his new 35 h.p. Caudron, G. L. Temple on his 50 h.p. Blériot, and last, but not least, Gustav Hamel on his 80 h.p. Morane-Saulnier. The "get-off" of the two Maurice Farmans was rather peculiar, for both started simultaneously from opposite ends of the paddock and flew towards each other, turning away when at close quarters. Verrier's machine was a new one, and showed a remarkable turn of speed compared with others of its type. Hamel executed some more of his extraordinary "side loops," during some of which he flew upside down for some appreciable time. The Morane-Saulnier has such an effective warp that Hamel does not appear to have much difficulty in turning the machine sideways over on its back, and in doing so we noticed that he brings the nose of the machine up slightly just before he banks over. In addition to these evolutions, Hamel performed several other stunts, including some spirals, climbing the meanwhile. Temple's performance was also in the modern style, his bankings being such that it was hard to tell whether he was upside down or not. He ascended to a height of 4,000 ft. or so, and was lost to view in the clouds. He finished up with a vertical semi-upside-down dive of about 1,000 ft., flattening out very gently.

The cross-country handicap was flown over the 16-mile Bittacy Hill course (4 laps), and produced six starters, as fallows:—L. Strange on the 50 h.p. G.-W. 'bus (10 mins. 28 secs.), Marcus D. Manton on a similar but later machine (7 mins. 38 secs.), F. Goodden on the 45 h.p. Caudron (5 mins. 44 secs.), R. H. Carr on the 75 h.p. G.-W.-Maurice Farman (5 mins. 8 secs.), Pierre Verrier on the Aircraft-Maurice Farman (3 mins. 34 secs.), and Philippe Marty on the Morane-Saulnier (scratch). Verrier easily obtained first place, and came home 35 seconds in front of second man, Marty, who put up a fine effort from scratch. Strange came in third, 10 seconds behind Marty, and Goodden followed 18 seconds after, having passed Manton on the last lap. Carr, on his new mount, strayed a bit on the course owing to the mist, and came in last. After the race some more exhibition and passenger flights were made, whilst Hamel gave a further demonstration on his 80 h.p. Morane-Saulnier.

Cross-Country Handicap (16 miles) for Hendon Cup.

		Handicap.	Handicap Time.
		m. s.	m. s.
1.	Pierre Verrier (75 h.p. Maurice Farman biplane)	3 34	25 43
2.	Philippe Marty (50 h.p. Morane-Saulnier monoplane)	scratch	26 18
3.	L. Strange (50 h.p. G.-W. biplane)	10 28	26 28
4.	F. Goodden (45 h.p. Caudron biplane)	5 44	26 46
5.	Marcus D. Manton (50 h.p. G.-W. biplane)	7 38	26 58
6.	R. H. Carr (75 h.p. Maurice Farman biplane)	5 8	27 22

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Aeroplanes for Ambulance Work.

ANOTHER use for aeroplanes in war time was dealt with by Lieut.-Col. J. F. Donegan, R.A.M.C., in a lecture at the Royal United Service Institution on Wednesday evening. He said that not long ago an expert of experience told him that he considered that before long aircraft would be used for the transport of detachments of troops on the field. When that was possible he had little doubt that they would be available for the removal of wounded who were able to sit up, having due regard for the rapidity with which aeroplanes could act, as compared with vehicles confined to roads, and also the fact that they could proceed regardless of roads or bridges; neither should they hamper or delay troops moving in a different direction. They might also be useful in scouting for wounded at night, if fitted with searchlights.

FLIGHT

ARMCHAIR REFLECTIONS.

By THE DREAMER.

Women of England, Here's your Chance!

I HAVE been asked whether I am in favour of women taking up aviation in exactly the same way that men do: I am not at all sure of my own mind in the matter; let's go into it. There is, of course, the oft repeated stereotyped phrase, that the place for a women is at home. To my mind this statement is generally dogmatically made by people who have made up their minds without thought, and without being in a position by the digestion of facts, to bring their argument to a logical conclusion; and used principally to close the argument before it is opened, as being the shortest way out of a position they have taken up but cannot sustain. I want to leave out the faintest breath likely to drift us towards women's suffrage, which to my mind has done more to kill the spirit of chivalry in the attitude of men towards women than anything I know. Man is, for his own benefit generally, pretending to take woman at her own valuation. Well, now, if man is going to shield himself by pretending that the reason he does it is because women have attempted to prove that they are men's equal, and are therefore ready to meet him on a level footing, he must also give in that they are perfectly entitled to become pilots if they want to, and show them a fair field and no favours. It would, of course, be a sad day for this or any other country, including the women themselves, if the majority of women took to the masculine life of independence, working and maintaining themselves throughout life without the aid of men. This would not only affect an already over-cheap labour market, but it would affect the birth-rate, and a country with a falling birth-rate that cannot be checked, is doomed as a nation, and in falling, will drag down all with it, including the prime cause, women themselves.

On the other hand, I do not see any reason whatever why women should always be looked upon as food-cooking-maternal-machines. Women are born into this world with the same right to live and enjoy life that men have, providing always that it does not interfere with race continuity, which must ever stand first and foremost, for the sake and benefit of all. On this footing I do not think there is much to be scared about. The maternal instinct is very strong in the women of this country, whatever it may be in other countries, and leaving out the very few, it seems to me that women will nearly always get married when opportunity, circumstance, and heart combine, no matter to what position they may have arisen in the commercial world. We see this almost every day, when women give up lucrative positions to enter the hymeneal state.

Personally, I do not think that women, taken as a whole, have sufficient strength of mind and nerve combined to act quickly and with decision in moments of grave difficulty. Women, most of them, are more afraid of accidents and death than men are, and are not so able to disregard these in moments where to fail to act instantly means disaster, and they cannot so readily think only of the business on hand to the utter disregard of all else. I know there have been brave women in the past, as there have also been cowardly men, but this proves nothing.

Again, speaking personally, I do not see any reason why any woman who would like to take up flying, and thinks she has the requisite nerve, should not do so. In any case, there is not likely to be so many that it will affect anybody, and if flying ever comes to be a sport in the same or even in a similar way to motoring, I think women are as much entitled to enjoy it as men. I suppose really women should do exactly as they like, just as men do—I don't see any reason why they shouldn't, and if I were a woman I am quite sure I should!

Well, now, having disposed of that, here is something I should like the women of England to read, and think carefully over—something where they CAN step in and show the men what they can do. There seems to be a general impression amongst those in a position to judge, that the Atlantic flight stands a good chance of taking place during this year, and that the *Daily Mail* prize of £10,000 will be paid over before we celebrate another Christmas. Whether it will be won, if won at all, by an English machine, an American one, or one from the Continent, it is hard to say, but in all these countries steps are being taken to prepare machines for the journey. In America and on the Continent, I believe the steps are assuming a concrete form, but in England it is merely whispered that so-and-so or so-and-so are going to have a cut. I know of no firm who have publicly announced their deliberate intention of doing so, and thinking of the way intending competitors dropped out one by one over the Circuit of Britain as the day for the start drew near, I can quite see the possibility of us getting left.

I take it that all English men and English women would like to see England the winner, from a love of nation and apart from any monetary gain, and a little encouragement of the hard and jingling sort would help matters considerably. There will not be very much in the prize beyond glory for whoever wins it, and it is hardly fair to expect a private firm to put up all the money, and run all the risk of failure, for what after all will be, if won, a cause for national rejoicing. I myself cannot see much in it for anybody except the builder of the engine, who will have proved the reliability of his wares; because, after all, it is more a matter of an engine with a machine large enough to carry enough fuel to feed it than anything; always excepting the pilot, of course, who will have to be not only good as an aviator, but a man of iron, to stand the strain of 72 hours' continuous flying, even with dual control.

Why not a National Machine to Win Glory for the Nation?

The Women's Aerial League have already done so much for aviation in this country, and are still doing so much, that they must have their hands so full that I dare not ask them to take up the suggestion, but I am quite sure that the women of this country could, if they would, get up a national subscription amongst women which would provide the necessary capital to build a machine capable of the journey; to provide the money necessary for the testing and subsequent alterations, or even partially rebuilding, and to finance the whole thing through to a probably successful finish. I believe that the aeroplane has now reached the position where it is simply a question of money and a little experimenting to build a machine capable of winning the prize, and if the women of this country were to subscribe the money, build their own machine and win, what a glorious day it would be for them, and we mere male things would, I am sure, enter most heartily into the celebrations—we can always do our fair share of that.

FLIGHT

JANUARY 17, 1914.

WIND GUSTS AND THE STRUCTURE OF AERIAL DISTURBANCES.*

By W. N. SHAW, LL.D., Sc.D., F.R.S., F.Ae.S.

AFTER defining gusts as being "fluctuations of wind force at short intervals," which have "every stage of gradation from the ordinary gustiness of an otherwise steady wind, with about seventeen fluctuations a minute, to the equally irregular recurring squalls, themselves made up of groups of gusts at intervals of half an hour, more or less"; Dr. Shaw observed that he was disposed to regard these phenomena as the turbulent motion of the atmosphere, as distinguished from the streamline motion of the undisturbed atmospheric current, although he supposed that all air currents must have in them a certain amount of circulation in consequence of their movement being carried out on the rotating earth.

He said that he proposed to discuss the cause or causes of the turbulent motion which is found in the atmosphere, and proceeded:—

We know for certain from experiment, as well as from observation, that eddy motion is produced when a steady current of air moves along even a smooth, solid, or liquid surface, and still more so when it passes an obstacle, so that the surface of the sea, or of flat land, or still more conspicuous obstacles in the shape of waves, cliffs, buildings, trees or woods, will cause eddy motion. Much time and trouble has been spent at the National Physical Laboratory at Teddington in securing a current in an air channel reasonably free from eddy motion, and it is this kind of eddy motion which is manifest in the gustiness of an ordinary wind. We may be pretty sure of that from the differences which we notice between the gustiness of different exposures as recorded by our anemometers; and in illustration of this point let me call attention to the traces of the anemometers at Aberdeen, Pendennis Castle, Shoeburyness, and lastly Gibraltar. The gustiness is evidently dependent upon the direction from which the wind comes. The wind which advances over a gradual slope direct from the open sea is much less gusty than that which comes over land. Moreover, the gustiness as estimated by the range of velocity during any interval to the mean velocity for that interval has been shown by examples to diminish with increasing height, but the law of decrease is evidently not a simple one.

The most extensive fluctuations in the wind are those which are shown on the anemometer at the top of the rock of Gibraltar when the wind blows on the east cliff, which is very abrupt, but in that case we have to deal with a special form of localised disturbance which we call the cliff eddy.

Permanent Eddies over Cliffs.—When the wind blows on the face of the cliff with sufficient velocity we get a permanent eddy which can be observed in a strong wind on any cliff, and which, in the case of Gibraltar, is bounded by a sheet of air going upwards at a steep angle, sometimes for hundreds of feet. The peculiar characteristics of the anemometer trace in that case probably represent not so much fluctuations in the velocity of the wind itself as the fluctuations in the upward direction, to which the anemometer responds by the sudden transition from pressure to suction at the opening which is designed for pressure. As the variation of the upward direction depends upon the velocity with which the air approaches the cliff, we get the interesting feature of an optimum value for the wind velocity shown in the chart, which is not the maximum of the wind velocity.

This eddy motion of air flowing past obstacles is thus of a complicated character, and it is a question whether we can describe it in general terms at all.

Vortex Rings.—The case of eddy motion with which most people are familiar and which is most easily described is the vortex ring, which can easily be obtained by a current of air passing with suitable rapidity through a circular opening. In that case the eddy motion is quite persistent, and the vortex ring travels with a velocity depending on its speed of rotation. If the vortex ring is circular it moves without change of shape; if it is not circular, but still a complete ring, it is still persistent, but oscillates about the mean position of circularity.

Incomplete Vortices.—The vortex ring must be complete in order that its core of low pressure may be completely protected. If the core is not protected the whole system rapidly disintegrates. We know from the persistence of semi-circular vortices in water that the core of a water vortex can be sufficiently protected by the creation of a gravitational pressure-difference at the cut end, and a smooth rigid surface would do as well; but in the atmosphere there are no facilities for those kinds of protection, and therein we have consequently to deal with vortices necessarily incomplete and in all stages of disintegration. The complete circular or semi-circular persistent vortex is therefore of little help to us and we must seek some other mode of description.

Relation of Vortices to Gusts.—Experiments at the National Physical Laboratory have shown that a steady air current passing an obstacle throws off a succession of nearly complete vortices which are sufficiently persistent for their shape to be recognised, though subsequently they disintegrate rapidly. Out of the steady motion and the obstacle we get a sort of pulsating motion, which on the larger scale would be represented on an anemogram by a series of gusts. One step in the description of the turbulent motion, due to an obstacle, would therefore be to say how frequently these vortices are given off. I speak with diffidence, for I do not know what the law is, but I suppose that with an increasing current the eddies are formed and sent off more and more rapidly until we get a quasi-permanent but pulsating cliff eddy from which masses of air in turbulent motion pass away to leeward.

Turbulence in Absence of Large Obstacles.—The eddies due to a comparatively flat surface of land or water are still more difficult to describe. Mr. Mallock has pointed out that the eddy motions in steamer smoke are due to wind and water and not to wind and steamer, and I have often watched steamer smoke with a view of resolving its convolutions into something which could be described, but so far without success.

Turbulent Motion without Material Obstacles.—There is, however, another question to which I shall now ask your attention, and that is whether material obstacles are necessary for the production of turbulent motion that may affect an airship or an aeroplane. To that I think the answer is obviously "no," and it leads to the consideration of the origin of turbulent motion in the free atmosphere itself. In the tropical revolving storms we have examples of real vortices with vertical axes maintained sometimes for several days together. They are a hundred miles or so in diameter, they travel at a slow rate, about 10 miles an hour, and they originate over the sea in circumstances which have little or nothing to do with surface friction. The difficulty about them is to understand how the low pressure at the core is maintained when all the processes which we see going on tend to reduce it. If that difficulty were disposed of the rest is easy; the conservation of angular momentum would account for the violence of the winds if the successive rings of the vortex are diminishing the diameter.

Besides these we have the tornadoes of the North American plains, which are perhaps a quarter of a mile wide and seem also to be rotary; they last for a few hours. There are besides the occasional dust "devils" or little whirlwinds and waterspouts, which are similar but less destructive.

About these three types of turbulent motion, let me remark that for some reason or other, which I cannot give you, they have the characteristic of persistence for days, hours, or minutes, as the case may be.

Turbulence set up by Temperature Differences.—Now there is a cause of local circulation in the atmosphere, in the sense of turbulent motion, in the convection of relatively warm and cold air. We seem to be able to trace cause and effect in this matter in the case of the line squall in which apparently there is a long line or cascade of descending air which pushes up the warmer air in front of it. In general character the phenomena are not, strictly speaking, vortex motion, because the air that descends, being cold, will not rise again and complete its circle, but there might very well be a core of turbulent motion between the two currents. There is also generally some horizontal circulation, because the two main currents are seldom parallel, so that it is quite possible, and even likely, that the violent relative motion may give rise to line eddies which ultimately drop one end on the earth. Mr. Clarke's sketches of the line squall of October 15th seem to illustrate this process. They show the cloud formation, the turbulence with horizontal axis degenerating into little waterspouts of eddy motion with vertical axes, but the "where?" and "when?" of the formation of such vertical eddies out of the vertical relative motion are beyond our powers. Certain it is that the destruction of the Zeppelin off Heligoland, on September 8th last, may be attributed to turbulent motion originating in the convective condition of the atmosphere itself.

Disturbances due to Cloud Formation.—And here let me point out, in conclusion, that convection of any kind in the atmosphere must necessarily disturb the distribution of air currents and give rise to eddies and variations of wind such as those which we call squalls.

We are accustomed to regard the formation of cloud as carried on in the general air current without much disturbance of other atmospheric processes. I have been recently computing in some detail the changes of pressure-difference in different layers, and I have arrived at the formula,

$$0{\cdot}0342\,\frac{p}{\theta}\left(\frac{\Delta\theta}{\theta}-\frac{\Delta p}{p}\right)$$

(where Δp is the difference of pressure between two places on the

* Abstracts from a paper read before the Aeronautical Society on January 7th at the Royal United Service Institution.

same level, and $\Delta\theta$ the corresponding difference of temperature) as expressing the increase in the pressure-difference between two places for a metre increase of height. With this formula applied to each successive metre we can find the pressure-difference at any level from the existing conditions of temperature. Now suppose a convective circulation to take place with the deliberation that the atmosphere always shows, we get at once the essential elements of eddy motion.

Suppose that for a kilometre of thickness the air becomes five degrees warmer in the one vertical and five degrees colder in the other; the mean difference in Δp may be left out for the moment, we get for the change introduced

$$34{\cdot}2 \times 3 \times \frac{10}{300}$$
$$= 3{\cdot}42\ mb.$$

The pressure difference at the bottom may be not more than 10 *mb*, and, consequently, the result of the convection, which appears to the onlooker merely as a striking cloud, is also a signal to the bottom to change the velocity of the wind there by 30 per cent. and the wind pressure by about 60 per cent. So we must regard every warm patch and every cold patch in the upper air not merely as floating along and doing nothing, but as making up the pressure distribution upon which the surface wind depends, and every disturbance of temperature by convection means a corresponding disturbance of the regularity or steadiness of the wind.

When, therefore, one speaks of the structure of a disturbance for the purpose of aeronautical science, let it not be supposed that the actual wind-structure of the moment is the end of all things; the temperatures of the different parts of the structure are, at least, an important element in the matter of squalls and wind, and as a step towards the comprehension of the structure we must not overlook the temperature differences of different parts. Temperature differences cause convection and convection causes turbulence. Hence, convective weather, whatever be its immediate cause, perhaps the sequence of events on a line squall, or the intense local heating of a sunny day, is likely to be turbulent weather for the airman.

In the course of the discussion on Dr. Shaw's paper on "Wind Gusts and the Structure of Aerial Disturbances" at the meeting of the Aeronautical Society on January 7th last, it was suggested by several speakers that the time had arrived when combined action should be taken by the Society and by their guests on that occasion, the Royal Meteorological Society, to accumulate and dissect information on the nature of the disturbances to which the air is subject. The chairman, Major-General Ruck, agreed that such a course was eminently desirable, and said that there was, without doubt, much data available, but owing to the absence of a properly constituted body to deal with these matters, it was not used to the best advantage. He, therefore, thought that they might form a joint committee of the two societies immediately, on which those interested in this work would be adequately represented.

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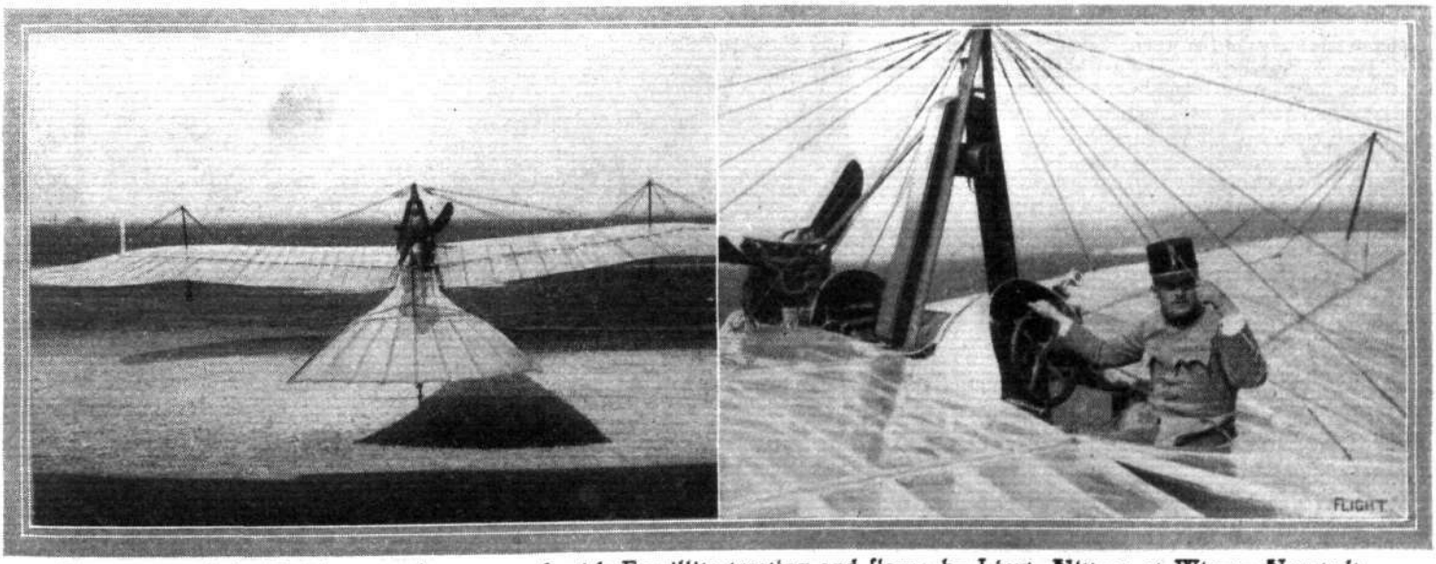
INVISIBLE AEROPLANES.

ONE important point which the designer of a military aeroplane has to keep in mind is that his machine, when in the air, must be as hard to discern as possible. There have been several attempts to build an aeroplane with the wings of transparent material, and in May and June of 1912, Lieut. Nittner was flying at Wiener Neustadt, near Vienna, an Etrich monoplane, specially built on such lines for Capt. Petroczy, formerly commandant of the flying corps in the Austrian Army. This machine had the planes covered with a special variety of Emaillite cellulose sheets, and the system has since been developed and patented in all countries by MM. Leduc Heitz, of the Paris House of Emaillite. A photograph is reproduced of the Etrich machine, to which reference has been made, and which those present on the ground were unable to locate in the air when flying at an altitude of between 900 and 1,200 ft. It is stated that at a height of 700 ft. only the framework is dimly visible, and this and the outline of the motor and pilot and passengers present so small an area to rifle or gun fire, that at the rate of speed at which aeroplanes are flown to-day, accurate aiming at such surfaces becomes nearly impossible. There are also secondary advantages in the use of such transparent sheeting in the construction of aeroplanes. For one thing, it enables the pilot to keep an eye upon the interior framework of the planes, and to detect at once any straining or fracture of the ribs, &c. Another advantage is that the highly polished smooth surface reduces the friction, as was proved in the case of Capt. Petroczy's machine, although, as that was the first machine to be so treated, the material used was not so suitable as the latest product. The surface could not be properly tightened, and owing to the sheeting being more or less plastic it presented a wavy surface, while some difficulty was experienced in securely fastening it to the ribs.

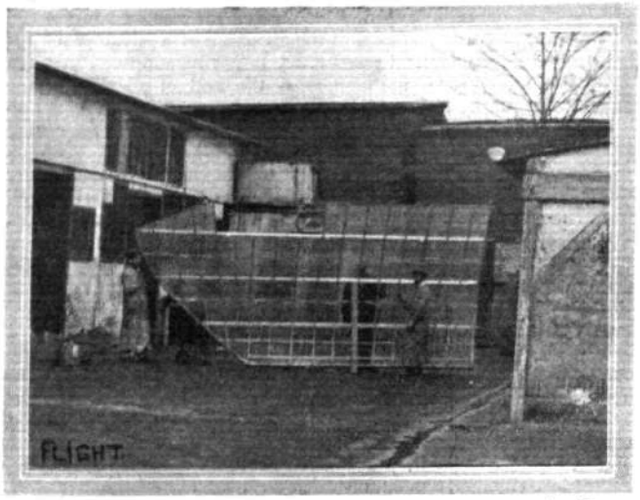
As long ago as 1904, Prof. Reisner, of Aachen, suggested that polished celluloid should be utilised for aeroplane sheeting in order to diminish air friction.

Last year, M. W. A. Lebedeff, working in conjunction with the Russian Government, tried to cover a Henry Farman biplane with transparent cellulose sheeting of a somewhat modified composition. This material was not so heavy as that used in Austria, and it was also somewhat stronger (its tensile strength being about 7 kilogs. per square millimetre of section), but the wavy surface of the wings, due to the flexibility of the material, could not be overcome.

After working at the problem for some time the Emaillite firm have developed a better material which was seen at the Paris Show on the planes of the Moreau monoplane. Instead of using ordinary cellulose sheeting, this machine has what might be termed a reinforced sheeting consisting of two layers of Emaillite with a sheet of silk tulle between them, the tulle being specially treated to render



Two views of the Etrich monoplane covered with Emaillite treating and flown by Lieut. Nittner at Wiener Neustadt. It will be noticed especially from the photograph on the right that the inner construction of the planes can be seen through the top surface.



A wing of the Moreau aeroplane which was at the Paris Salon. It will be seen that the man standing behind the planes is as visible as the one in front.

it transparent. That the material is to all intents and purposes transparent is illustrated by the photographs of one of the wings of the Moreau monoplane behind which a man can be clearly seen. The use of the tulle liner not only strengthens the material but it also prevents it sagging or warping between the ribs so that by its use it is quite possible to obtain a smooth and regular surface on the planes. The tensile strength of the material is about nine to ten kilogs. per square millimetre section and a ·35 mm. sheeting is sufficient to ensure a tensile strength of about 2,800 to 3,000 kilogs. of the wing covering, a stress which is never attained with the best fabrics in use. The weight of this new Emaillite material does not exceed 375 grammes per square metre, which is but 40 per cent. more than the weight of good doped linen fabric as generally used, so that the increase of weight in the case of ordinary machines would be between 12 and 15 kilogs. It is claimed for this new Emaillite transparent reinforced sheeting that it has all the advantages of that which is not reinforced without its faults. It can be fastened either by nailing, sewing, or by using an adhesive solution. It will not tear or break when anything such as a tool falls upon it, while should it be pierced by a bullet the fabric liner would prevent the damage extending. The British patents for this invention are held by the British Emaillite Co., Ltd., of 30, Regent Street, W. Extensive tests are shortly to be carried out with machines covered in this way, in order to ascertain the height at which they become virtually invisible.

BRITISH NOTES OF THE WEEK.

THE ROYAL FLYING CORPS.

THE following appointments were notified in the *London Gazette* of the 9th inst. :—

R.F.C.—Military Wing.—*Special Reserve of Officers.*—The undermentioned Second Lieutenants (on probation) are confirmed in their rank :—Gordon N. Humphreys and David E. Stodart.

The following were announced by the Admiralty on the 9th inst. :—

Lieut. H. E. M. Watkins, R.N.R., to "Pembroke," additional, for course of instruction at Central Flying School, January 27th.

Sub-Lieut. F. G. Saunders, R.N.V.R., to "Pembroke," additional, for course of instruction at Central Flying School, as Probationary Sub-Lieut. (R.N.R.), January 27th.

The following was announced by the Admiralty on the 12th inst. :—

Assistant Paymaster T. Goldsmith, to the "Pembroke," additional, for Naval Airship Section, Farnborough, to date January 15th.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending January 10th :—

Flying Depôt. S. Farnborough.—Experimental and repair work was carried on as usual.

No. 2 Squadron. Montrose.—The squadron was employed in removing stores and sheds to the new flying ground at Bloomfield. The snow and weather generally render this operation a slow one.

No. 3 Squadron. Netheravon.—The squadron pilots were out frequently during the week and a few long flights were made.

No. 4 Squadron. Netheravon.—The officer and N.C.O. pilots carried out reconnaissance flights on several days of the week.

No. 5 Squadron. S. Farnborough.—Instructional flights were made by the officer pilots of the squadron, and overhaul and repair work continued.

A Fine Flight by Pixton.

BY way of delivering the eighth War Office Sopwith tractor, C. H. Pixton, on Monday morning, flew from Brooklands to Farnborough, the trip taking exactly 8½ mins. By the route followed the distance is not less than 16 miles, so that the speed worked out to over 110 m.p.h. The wind gauge at Brooklands showed between 20 and 30 m.p.h., and higher up the wind was quite 40 m.p.h., besides which it was snowing hard all the time.

Leeds Aviation Meeting.

SOME fine flying by Hucks on his Blériot and H. Blackburn on the 80 h.p. Blackburn was seen by large and enthusiastic crowds at the Aviation Field, Moortown, on Wednesday, Thursday and Saturday of last week.

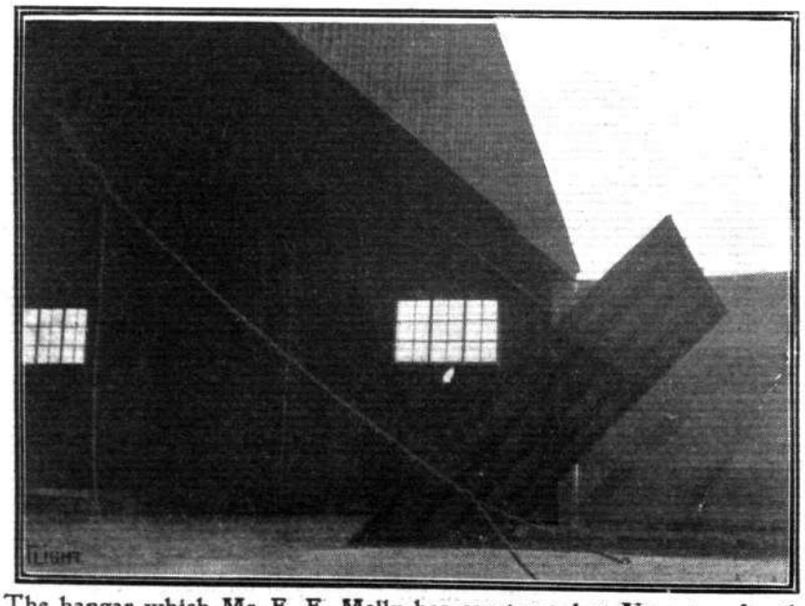
On Wednesday, Hucks made a couple of flights, looping in all 10 times, but Blackburn, who was flying to Leeds from York, had to return to York after reaching Tadcaster, owing to fog and mist. On Thursday, Hucks looped several times at a very low altitude. Blackburn (who had arrived from York in the morning) made a long flight with Dr. Christie as passenger. During the gale on Friday, Blackburn made a passenger flight with Mr. C. Bingham, of the Blackburn Aeroplane Co., at times rising above the clouds. On the Saturday, despite wind and rain, H. Blackburn gave a fine exhibition of banking and diving, with Dr. Christie as passenger. Hucks also flew, but the frightful weather conditions rendered upside-down flying impossible. Blackburn also made a trip, with Dr. Christie as passenger, to Harrogate and back.

"Sunday Best" for the R.F.C.

HITHERTO the men of the Military Wing of the Royal Flying Corps have been dressed in khaki, but now they are to have a Sunday suit of blue cloth, similar in style to that of the Royal Field Artillery. The buttons will bear the monogram R.F.C., while those men who have qualified as pilots or mechanics will bear badges, representing propeller blades, on the left breast. One of the first to don the new uniform was Sergeant Griffin at his wedding last Saturday.

The Flying Station at Nuneaton.

REPRODUCED herewith is a photograph of the hangar Mr. E. F. Melly has built at Nuneaton for the benefit of aviation in general, and to which reference was made in FLIGHT some time ago. The hangar, the specification for which was drawn up by Mr. H. G. Melly, of the Liverpool Aviation School, is 50 ft. square, 12 ft. clear headway, and has two hinged doors with two drop doors which are



The hangar which Mr. E. F. Melly has constructed at Nuneaton for the benefit of aviators generally.

raised by blocks and tackle, and can easily be worked by two men. These doors when lowered make a splendid floor to work on if any repairs have to be done to a machine. The landing ground in which it stands is 12 acres, and open in three directions, and is only ten minutes' walk to the middle of the town. Nuneaton is exactly half way between Manchester or Liverpool and London, and may be said to be the centre of England.

Sunbeam Activity.

ON Wednesday and Saturday of last week, at Brooklands, J. Alcock took up several passengers on the M. Farman with 100 h.p. Sunbeam engine, and on Thursday morning he made a good cross-country flight with a passenger.

A Lady Mayoress Flier.

ON Tuesday afternoon the Lady Mayoress of Leeds (Mrs. Charles Ratcliffe) enjoyed a view of Leeds from aloft, being taken up to a height of 2,000 ft. by Mr. H. Blackburn on Dr. Christie's 80 h.p. Blackburn monoplane.

Mr. Ewen to Lecture in Edinburgh.

TWO cinematograph lectures on the subject of "Learning to Fly" are to be given by Mr. W. H. Ewen in the Princes' Cinema, Edinburgh, at 3 and 8 p.m., on Tuesday, January 20th. Members of the Edinburgh Aeronautical Society, on showing their membership cards, will be admitted free.

A Lecture by Capt. Waterlow.

ON Friday, January 30th, at 3.30 p.m., Capt. C. M. Waterlow, R.F.C., will give a lantern lecture before the Ladies Automobile Club, at Claridge's Hotel, on "Airships, Past and Present."

"Shell" Spirit was Used.

FOR his looping the loop flight, with Miss Trehawke Davies as passenger, Mr. Gustav Hamel relied on Shell motor spirit.

FOREIGN AVIATION NEWS.

Duma President Flies.

DURING a visit to the South of France last week, M. Malikoff, the President of the Russian Duma, was taken for a flight by Maicon on his 100 h.p. Anzani-Caudron waterplane. Starting from Beaulieu, Maicon flew along the Côte d'Azur to Monte Carlo, alighting in the harbour before returning to his starting point.

The Red Ribbon for Moreau.

IT was announced last week that M. Moreau, the inventor of the Moreau automatic stability machine, had been honoured with the Cross of the Legion of Honour.

Fast Flying on Morane "Parasol."

ACCOMPANIED by Vidart, and flying the Morane parasol, L. Gilbert started from Villacoublay on the 8th inst. An hour and five minutes later he landed at Mourmelon, having covered a distance of 200 kiloms.

Another Prize Offered by Paris Council.

THE Parisian Municipal Council has offered a sum of £400 to the French National Aerial League, and it has been decided to utilize the money for a prize for a speed competition between two capitals.

A Signal Device for Aeroplanes.

IT is announced from Paris that the Breguet firm has designed a signalling device, which appears to be on similar lines to the James Means system described in FLIGHT for March 16th, 1912. A valve operated by the pilot or passenger releases soot from a reservoir in such a way that long or short streaks of black are formed in the wake of the machine, thus permitting messages to be transmitted under the Morse code. It is stated that with field-glasses it was found possible to read a message at a distance of five miles.

Long Flight by E. Vedrines.

HAVING recovered from his injuries sustained when his machine took fire while making an attempt on the speed records, Emile Vedrines on Saturday last made a flight of an hour and a half at Rheims. He intends shortly to undertake a long flight, probably to Morocco.

A Ponnier for French Army.

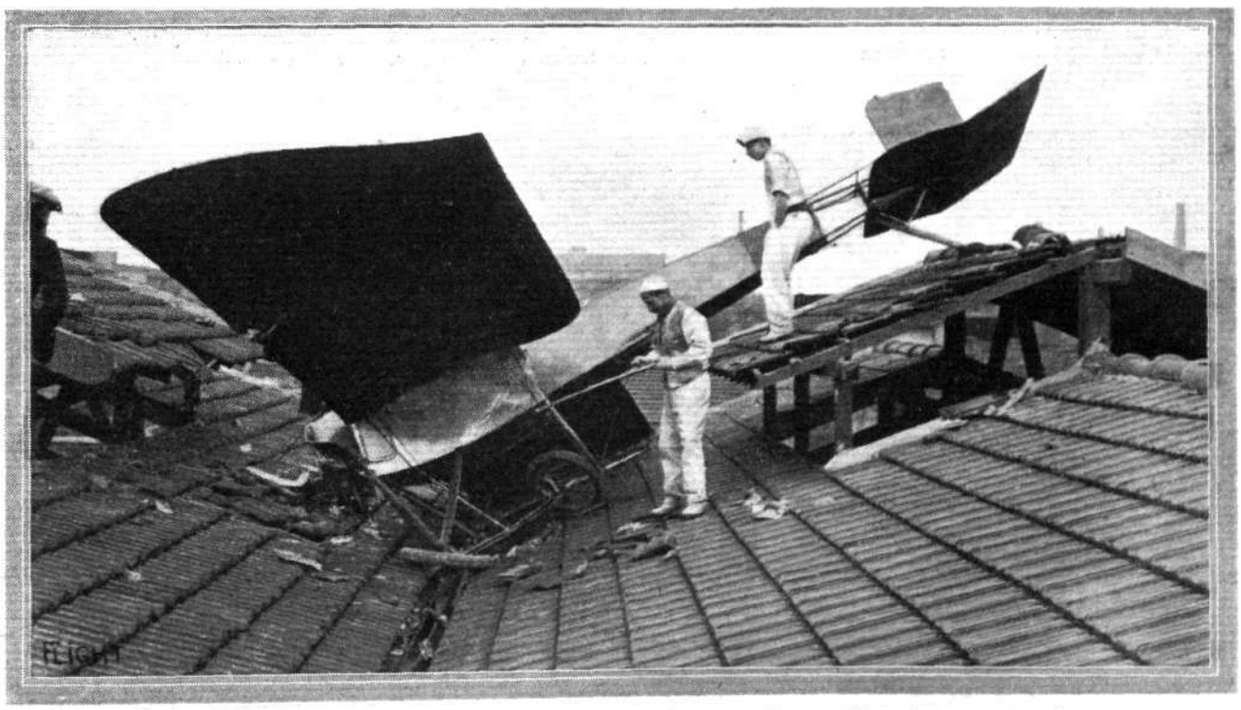
AT Rheims on the 7th inst., Bielovucic, before a military commission, tested a Ponnier scouting aeroplane for the French Army. The monoplane, which is fitted with a Rhone motor, climbed 1,500 metres in 5 mins.

Gibert Lands on a Roof.

AFTER a long rest Gibert has returned to aviation, but his return was inauspicious. On the 8th, he went up at Issy on a Vendome monoplane, and on getting to a height of 500 metres flew round the Eiffel Tower. Soon after he commenced a *vol plané*, and seemingly miscalculated the rate of descent. When about thirty metres from the ground he switched on, but the motor refused to start, and the machine crashed on to the roof of a tile-works. Surprisingly little damage was done to roof and machine, whilst the pilot was unhurt.

M. Farman's Week-end Trip.

ACCOMPANIED by Derome, and on one of the latest type machines, Maurice Farman on Saturday flew from Buc to near Arpajon, and then went round Montlhery before returning to Buc.



Gibert's monoplane after his landing on the roof of some sheds near Paris. Note how, under the circumstances, comparatively little damage of any sort was done, either to the building or the machine.

Testing a New H. Farman.

ON the 8th inst. at Buc, Henry Farman was testing a new biplane with the *fuselage* placed midway between the two main planes. After a long cross-country trip the machine was banked steeply, and made some steep dives. On his descent Henry Farman expressed himself as very satisfied with the way the machine behaved in the air.

To Revive Issy as an Aerodrome.

IN the early days of aviation in France, Issy was quite an important place, but the various restrictions which have been imposed from time to time have had the effect of driving away most of those who used to make it their headquarters. A committee has now been formed, representing the various interests concerned, with a view to getting the restrictions removed and restore Issy to its former place as one of the chief flying centres.

Marking Routes in France.

ARRANGEMENTS have been completed by the Ligue Nationale Aerienne for the latitude and longitude of 31 principal places in France to be painted on the tops of the local gasometers so as to guide pilots. The numbers are ranged one above the other, the latitude being on top. The size of the numbers vary according to the size of the gasometer, the largest, 9·87 metres high, being used at Rheims.

With the Loopers.

SEVERAL additions were made last week to the ranks of the exponents of looping the loop and upside-down flying. Three of them were trained at the Blériot school at Buc, one being Mr. R. O. Crawshay, who has flown a Blériot on several occasions at Hendon. After only practising for two days, he succeeded on Wednesday of last week in looping the loop eight times. The next day at Buc, Count de Lareinty-Tholozan made six loops, while on Friday Baron Pasquier carried out some loops. On the 7th Gilbert did some loops on a Morane at Villacoublay, as also did Chemet on a Borel and Galtier on a Caudron at the Chateaufort ground near by. These two last mentioned also repeated their performance on Sunday. On Sunday last, looping flights were made by Garros at Barcelona, Honouille at Algiers, and Chanteloup at Troyes. On the 8th Chevilliard gave an exhibition at Havre, after which his machine was packed up for transmission to Nice.

Military Night Flying in Belgium.

A SERIES of experiments in night flying have recently been made at the Kiewit aerodrome by Lieut. Demanet. The officer has had his Farman fitted with a 50 c.p. headlamp at the front of the *nacelle*, while 12 c.p. lamps are arranged along the top plane. The current for these lamps is generated by a little dynamo, driven by the aeroplane motor, and charging a battery of accumulators.

December at Johannisthal.

DURING the month of December, 134 pilots made 2,410 flights, of an aggregate duration of 313½ hours, at Johannisthal. The longest flight was of 19 hours 11 mins. by Breitbeil, on an Ago biplane, while Reiterer made 278 flights on his Etrich Taube.

Orville Wright in Italy.

ON the 8th inst. Orville Wright arrived at Genoa from America, and left for Rome in order to meet the Italian Naval Ministry.

A Race from Genoa to Tripoli.

ARRANGEMENTS are being made in Italy for a race for hydro-aeroplanes from Genoa to Tripoli, a distance of about 2,000 kiloms. It is expected that the prize fund will be at least £4,000.

Marc Pourpe at Khartoum.

ON Monday afternoon, Pourpe completed his flight to Khartoum, taking 4¾ hours for a non-stop flight of 320 miles from Abu Hamed. In our last issue we recorded his arrival at Wady Halfa on January 8th, and on the following morning he progressed to Abu Hamed, taking less than 3 hrs. for the distance of 231 miles. On both these last stages, he was troubled by a side-wind which carried a lot of sand. Pourpe was welcomed at Khartoum by the Sirdar, Sir Reginald Wingate.

Vedrines Flies Round the Pyramids.

DURING a flight on his Blériot round the Pyramids on Monday, Jules Vedrines took as a passenger Rostovitz Bey, president of the Nuncovitch Co., who is 85 years of age.

Flying in Persia.

ON his Blériot-Gnome, Kouzminsky, on the 12th inst., flew from Kasra-Kadjar to Teheran, where he flew before the Shah and other members of the Imperial family.

A Chinese Fatality.

IT is reported from Mukden that a Chinese military biplane on returning to Kalgan after a reconnaissance along the Mongolian frontier, during which it was fired on by the Mongols, was capsized in a gust of wind. The pilot was killed and the passenger injured.

A Three-Seater for Brazil.

FOR use at the Brazilian Naval Flying School at Rio de Janeiro, a three-seater waterplane has been ordered from the Bossi firm in Italy. The machine will be a biplane fitted with catamaran floats. It will have engines of 300 h.p., and weigh in flying trim 1,000 kilogs. A mean speed of 80 k.p.h. over an out and home course is asked for, while the delivery tests will include two flights of two hours each with full load. The machine will be fitted with a wireless telegraphy outfit and a bomb-dropping device.

Fatal Accident to Chilian Aviator.

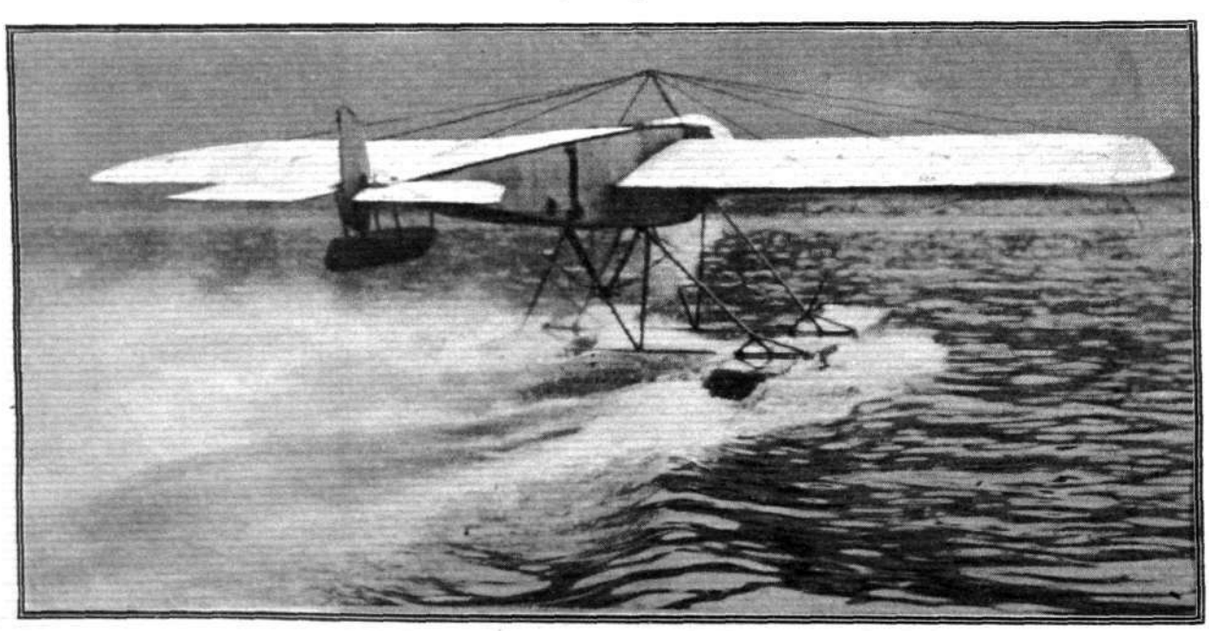
WHEN flying at a height of 1,000 ft. at Santiago de Chili, on Monday, the machine of Lieut. Mery, a Chilian military aviator, capsized. The pilot was killed on the spot.

"Z 7" on Trial.

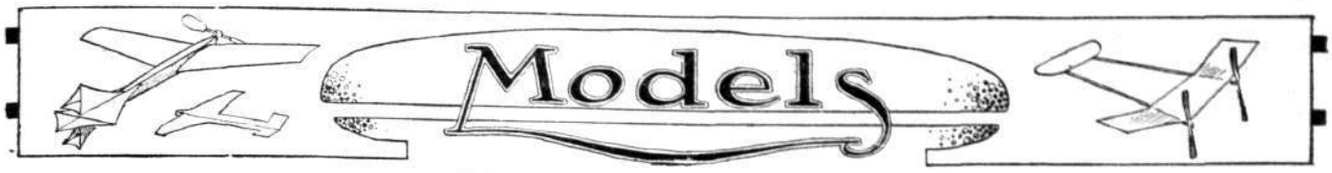
THE new Zeppelin, "Z 7," for the German Army, which is to be stationed at Dresden, commenced her trials at Friedrichshafen last week. The vessel, which is similar in general design to the ill-fated Naval Zeppelin, was in charge of Count Zeppelin during the trips, while the performance was noted by a commission of officers.

"Z 6" Goes to Leipzig.

ON Saturday last the military dirigible "Z 6" left Gotha at 10 a.m., and at 1 p.m. arrived safely at Leipzig.



A Borel waterplane taxying, as seen from behind.



Edited by V. E. JOHNSON, M.A.

The K. and M.A.A. Meeting at Caxton Hall.

THIS meeting, which was held at the above on January 9th, for the purpose of distributing the prizes won by aeromodellists at the recent *Model Engineer* Exhibition, and to hear a lecture by Mr. F. Handley Page on "The Dependence of Aviation on Experimental Model Work," was a most successful one in every way. We give below the opening remarks of Sir John Shelley, who presided. Mr. Handley Page's most instructive and able lecture will be fully reported in due course, as well as the interesting discussion which followed.

Sir John Shelley said it gave him great pleasure to preside over the meeting. He thought he was right in saying that most machines, or at any rate a great number of them, owed their success to lessons learnt from models, although perhaps this did not apply so much to model aeroplanes as to some other engineering types. This was perhaps due to the small size of the machines, which would, no doubt, be successfully overcome in the future. The principal power for model aeroplanes at present was twisted rubber; now, although even such models could, no doubt, be very useful in designing full-sized machines, the problem of the best and most suitable motive power was the most important point to find out. If they wanted to get themselves taken seriously by the aeronautical world, they must look beyond the present, if they did not want to be looked upon merely as makers of interesting toys.

For that reason he proposed giving prizes for models which could be useful in making full-sized machines. There was to be an aeronautical exhibition at Olympia in March, and he hoped that all members of the Association and the affiliated clubs would do their best by making models which could be used as models for full-sized machines. This would do more good for the Association than anything else. Anything done six months later would have nothing like such good results (even from an advertisement point of view only) as could be accomplished by doing them *now*.

With regard to the Kite and Model Aeroplane Association and the affiliated clubs all over the country, he had been asked what good it would do anybody to join the Association. Well! He had dealt with that question to the best of his ability. He did not think people fully realised the benefit of joining themselves together with one special object. Generally speaking an individual got nowhere, and what applied to individuals applied equally well to societies. They might have a large number of model aero clubs spread all over England, but they ought to have one central body to hold them together. If not they would be no better than so many individuals, without any means of exchanging ideas, and without any rivalry or incentive to do their best. He could not help thinking that the Kite and Model Aeroplane Association ought to do their best to keep in as close touch as possible with the country associations. They should offer prizes only open to such clubs and themselves. He would suggest that all competitions should be only open to members of the Association and the affiliated clubs, and not to those who merely entered a machine for a few, or perhaps only a single competition. He thought, therefore, the best thing they could do was for them to talk about this model association to their friends, and get them either to form clubs or join the central one. By so doing they would increase the membership and do a tremendous amount of good for themselves at the same time.

He would now call upon Mr. Handley Page to lecture upon "The Dependence of Aviation upon Experimental Model Work."

(To be continued.)

Paddington and District Aero Club.

We have received from the secretary, Mr. W. E. Evans, a copy of their financial balance sheet for the year, and also a list of the successes won by club members in open competition during the same time. The balance sheet is in a decidedly satisfactory state—the financial year starting with a small deficiency but finishing with a balance in hand of more than four times the deficiency, and this in spite of the fact that over £8 was spent in prizes alone. The prizes won in open competition include the Gamage Cup and Gold Medal, the London Aerodrome Trophy and Silver Plaque, and the K. and M.A.A. Silver Cup and Gold Medal (Distance and Stability Competition), &c., numbering some seventeen in all. In inter-club contests the club won three out of five. The club also holds six official British records out of a total of fourteen.

We offer the club our hearty congratulations on their successful year's work both financially and practically. We think the following "tip" a very good one, which all model clubs would do well to follow—one club at any rate does it with, we believe, considerable profit:—Send to the local newspaper a short and pithy account of your doings week by week, under a suitable title, not necessarily the exact name or title of the club, although needless to say, this should always be "worked in."

Some Remarks on the Management of Model Aero Clubs.

By W. E. EVANS.

Having been the secretary of a model aero club for some two years, I have come to the conclusion, firstly, that it is difficult to obtain truly enthusiastic members who will stick to model aeroplaning for more than a month or two, but those who persevere long enough to get over the often disheartening period of disappointment of the first few months cannot give it up. Therefore I advise the older members of clubs to assist the new members and novices as much as they possibly can with their model flying. The surest way to lose members is by jeering at a bad smash.

Secondly, as regards finance, I think a subscription of one shilling per month should be the minimum. A smaller subscription than this does not allow enough money to be devoted to prizes, and winning a prize, even though it be of small value, has often been the turning point leading to greater successes. Therefore prizes must be offered on a comparatively generous scale.

Thirdly, it is impossible for a small model club to rent a flying ground, and as model flying is not permitted on any public ground (except Wimbledon Common), it behoves the managers of such clubs to scour their districts and find a benevolent landowner who will accede to your request to fly your models on part of his ground.

Having obtained permission, do not take the liberty of flying on his ground on Sundays, and it is safer not to ask such a favour. You might get a decided refusal altogether. Do not fail to invite your benefactor and his friends down to his own ground one fine Saturday afternoon during the summer, and give them as good a display of model flying as you possibly can. A gentleman who is good enough to allow you to use his ground on Saturday afternoons free of charge will not be backward in offering a prize for competition amongst the members.

A club workshop is almost a necessity, but you will have to pay at least 3*s*. per week rent for the accommodation. I maintain a small club cannot afford this, and that they will be better off without it. If any workshop or clubroom is rented then the club's income from subscriptions should be at least double the amount of rent. Where subscriptions are small and economy the watchword, committee meetings may be arranged to take place at stated intervals at one or more member's homes.

The secretary should endeavour to keep in touch with all the members, especially the newer ones.

When any open competition is earmarked by the committee as a subject for attack, club competitions for similar models under similar conditions should be arranged for at least two or three weeks prior to that event, and prizes offered for the same. The club's chance of scoring on the eventful day will be greatly increased if this be done.

In conclusion, a word of advice to aeromodellists. Do not build a model hurriedly; even if it should turn out any good at all, it will be sure to be unreliable. Also do not copy one or more of the crack fliers' machines; let it be seen that your model is your own work and brains. If you must copy something do so, but don't steal a whole machine; try to effect some original improvement whether doubtful or otherwise; you will at least learn something by your experimenting.

What is Model Work?

A correspondent sends us a post-card, in which he says "that in his opinion matter has recently appeared in this section which is not of a 'model' character." Our correspondent refers, we presume, to the paragraphs dealing with man-carrying gliders. This raises the interesting question of what is and what is not model work.

In considering this question, relative to which in all probability no two people would hold exactly the same opinion, the question of the influence and value of such work on aeronautical progress in general is one which should not be lost sight of. This means that the scope of the work should be as extensive as possible. The question of *size* is not one that of necessity comes into consideration at all. Speaking generally, "models" are not unfrequently made *larger* than the originals. This is not so, of course, in aeronautical work—not, that is, of machines as a whole, although it is quite conceivable that it might be true of some particular *part* of the same, purposely built on an enlarged scale for testing or other purposes.

Whatever model work in a true comprehensive sense may or may not consist of, it most certainly does not consist *solely* in the making and flying of model aeroplanes; but in *all* useful and scientific work which can be carried out by the aid of such, no matter what the actual *size* of the particular apparatus in question may be.

Model aeronautical work is so intimately wrapped up and interwoven with aeronautical inventions that it is quite impossible (even were it desirable) to separate the two. Practical inventors usually make or have made a working *model* of their invention. This is often done for two reasons—firstly, to fully satisfy themselves that the idea is absolutely workable in practice, secondly, for demonstration purposes *re* intending purchasers of patents, &c.

Closely connected with this is the question of "aeroplane accessories." The writer has no idea of how many firms are "kept going" at the present time solely in manufacturing motor car accessories, but it must be a very large one. That the same will ever be proportionally true in accessories for aeronautical vehicles may be doubtful—certainly for some time to come. But it is always found that as any industry grows and becomes popular—so do the "accessories"—faster in fact than the industry itself.

Now a large number of such accessories would be of a distinct nventive character, and as such liable at any moment to become ncluded in "model work."

Apart altogether from the question of accessories in general, there is plenty of scope at the present time for *self-recording instruments* of all kinds. What we want to know as soon and as quickly as we can is: *everything that every part of the aeroplane does under every circumstance*, or at any rate as much about it as we can. Undoubtedly much can be learnt from careful and painstaking research work carried out by means of "models." So far it cannot be said that the undertaking of research work has been viewed with much favour by aeromodellists in general. The reason of this probably is that there is not, or, to speak more correctly, there does not appear to be as much "sport" in this kind of work as in competition and record breaking flights. We do not know exactly how any particular person would define the term "sport." Undoubtedly it is something which affords "excitement" and very possibly "risk." Now some research work is undoubtedly almost, if not entirely, devoid of both these elements, but there is plenty which is not. There is plenty of experimental work in which the least carelessness or failure in any part of the mechanism means not only injury but even the certain death of the operator; just as there is other research work which, whilst fairly safe so long as one exercises ordinary care, most certainly could not be classed as lacking in "excitement."

Every art and science are so intimately bound up with one another at the present day that the worker in any one particular field, or even some especial portion of that field, not unfrequently finds his progress brought to a temporary check by his lack of knowledge of something in itself quite foreign to his own particular subject. Probably to no other subject does this fact apply so much or so often as it does to aeronautics. Not only does the student of aeronautics require a first-class knowledge of all mechanical subjects (to say nothing of mathematics) as well as motors, but he is bound ere long to find that he must add a knowledge of electricity as well.

Electrical energy, when it comes to a question of h.p. per given weight, is at present not in the running as a motive power for actually driving our flying machines—but we cannot drive our aero motors without its assistance, and if it at any time refuse its kindly aid our motor at once becomes useless.

Again, there is the question of "Wireless." It is extremely difficult to keep abreast of the latest wave in the ocean of knowledge—but we believe that up to the present, although wireless messages have been sent by an aeroplane in flight, they have not yet actually been received by the same. In the case of airships an allowance of a pound weight per mile is usually allowed—*i.e.*, to send out messages to a station and receive them from the same at a distance of 100 miles necessitates an apparatus about 100 lbs. in weight, viz., about 70 lbs. for the transmitting and 30 for the receiving parts.

Of course, nowadays, even so large a weight as 100 lbs. is not in any way prohibitive even in the case of an aeroplane, but supposing the apparatus so improved that the same results could be obtained with an apparatus of only one-half the weight, then this means one of two things: either for the same weight an apparatus having a much greater range; or the same range, but the ability to carry 50 lbs. more in the way of fuel, *i.e.*, a greater range of operations.

When one endeavours, however feebly, to take a broader and more extended view of what model work should or at any rate *could* be, one cannot help feeling some regrets that such fine mechanical ability and skill, to say nothing of technical and scientific knowledge correctly applied, should be devoted to the mere sporting side of the question, and so little to the research side.

Without in any way going into such a vexed question of how much or how little use may be made of airships and aeroplanes in the next great international struggle, it is universally agreed that use will be made of them, and that the *first*, and in all probability the *decisive*, battle will take place in the air. Even assuming this not to be the case—their value as detectors of enemies either in the air or on the sea (fog alone excepted) can scarcely be overestimated. Once detected, the knowledge of the exact whereabouts of the enemy at headquarters might be priceless. To fly with the news would be absurd; how can a speed of even, say, 140 miles per hour, compare with a speed of some 186,000 miles per second, or, in other words, the, to us, instantaneous transmission that "wireless" gives us? We thus see that the future of "wireless" and of aeronautical work, some of it undoubtedly model, are intimately bound up together. In fact, the more deeply one probes the subject, the more difficult it becomes to say what art or science is *not* more or less intimately bound up with aeronautics.

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

Affiliation.—Stony Stratford and District Kite and Model Aeroplane Club have become affiliated to the Association.

Club Stands at Olympia.—Croydon and District Aero Club have reserved a club stand, thus bringing the number of clubs to six. Other clubs please note and reserve a stand without delay, so as to save disappointment.

Prize Distribution and Lecture.—On January 9th, the *Model Engineer* (Aviation Section) Prize Distribution was held at Caxton Hall, Westminster, before a large gathering of members and friends. The President, Sir John C. Shelley, Bart., presided, and was supported by Lady Shelley, Messrs. A. W. Marshall, representing *Model Engineer*; B. Cooper, A.F.Ae.S. (Sec. Aeronautical Society); F. Handley-Page, A.F.Ae.S.; V. E. Johnson, M.A., Model Editor FLIGHT; E. F. Chiozza Money and members of the Advisory Council. Lady Shelley presented the following prizes:—In Class 1.—Power-driven models: D. Hiscox, Bronze Medal and 1st Class Diploma. Class 2.—Hydro-aeroplanes: Mr. L. H. Slatter, Silver Medal and 1st Class Diploma; Mr. W. J. Williams, 1st Class Diploma; Mr. F. W. Jannaway, 2nd Class Diploma. Class 3.—Scale models: 1st, Mr. C. Desoutter, Silver Medal and 1st Class Diploma; 2nd, Mr. D. Hiscox, Bronze Medal and 1st Class Diploma; Mr. E. Micholls, 1st Class Diploma; 3rd, Mr. C. J. Lane, 2nd Class Diploma. Class 4.—Rise-off-ground models: J. E. Louch, Silver Medal and 1st Class Diploma; F. Wilkinson, Bronze Medal and 1st Class Diploma; L. H. Slatter, 1st Class Diploma; H. C. Bond, 2nd Class Diploma. Class 5.—Aero. motors: 1st, Mr. F. Mayer, Silver Medal and 1st Class Diploma; 2nd, Mr. C. Desoutter, 1st Class Diploma. All the above medals and diplomas were presented by Mr. J. Percival Marshall. The Leytonstone Ae. Club were presented with the handsome silver medals, presented by Mr. F. K. McClean, for the team contest in connection with the above. The team were: J. E. Louch, H. C. Bond, S. C. Hersom, F. E. Grattan, F. H. Hawthorn and H. Bedford. After the presentation Sir John called upon Mr. F. Handley Page, A.F.Ae.S., to lecture on "The Dependence of Aviation on Experimental Model Work," which was so ably delivered, that all present were only too sorry when over, but a full account will be given on Mr. Johnson's page. Special votes of thanks were accorded to the lecturer, moved by the hon. sec., seconded by Mr. B. Cooper; to Mr. Percival Marshall, moved by Mr. L. Ingram, seconded by Mr. V. E. Johnson; to Mr. F. K. McClean, moved by Mr. F. E. Grattan, and seconded by Mr. Towers, both of Leytonstone Club; to Sir John and Lady Shelley, by the hon. secretary, seconded by Mr. A. F. Houlberg. The meeting was the most interesting and instructive one that has been held, and it is hoped that other full-size designers and makers will come forward and give lectures, for it is by model experiments that money and time can be saved.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

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AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).
JAN. 18TH, at 10 a.m., flying, Wanstead Flats, as usual. If wet meet at club room.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).
JAN. 17TH, flying at Sudbury.

Sheffield Ae.C. (50, SPRINGHOUSE RD., WALKLEY, SHEFFIELD).
JAN. 17TH, at 2.30 p.m., general meeting at club room to decide whether the workshop is to be continued or not, also other business. Every member should make an effort to be present. Jan. 24th, at Standhouse Aerodrome, Intake, at 2.30 p.m., the tractor biplane contest for Mr. Manton's medal (weather permitting).

Wimbledon and District (165, HOLLAND ROAD, W.).
JAN. 17TH and 18th, flying as usual.

UNAFFILIATED CLUBS.

Edinburgh Aeronautical Society (41, DRUMSHEUGH GARDENS).
MR. W. H. EWEN will give two cinematograph lectures on "Learning to Fly" in the Princes Cinema, Princes Street, at 3 p.m. and 8 p.m., on Tuesday, Jan. 20th. Members, on showing their membership card, will be admitted free.

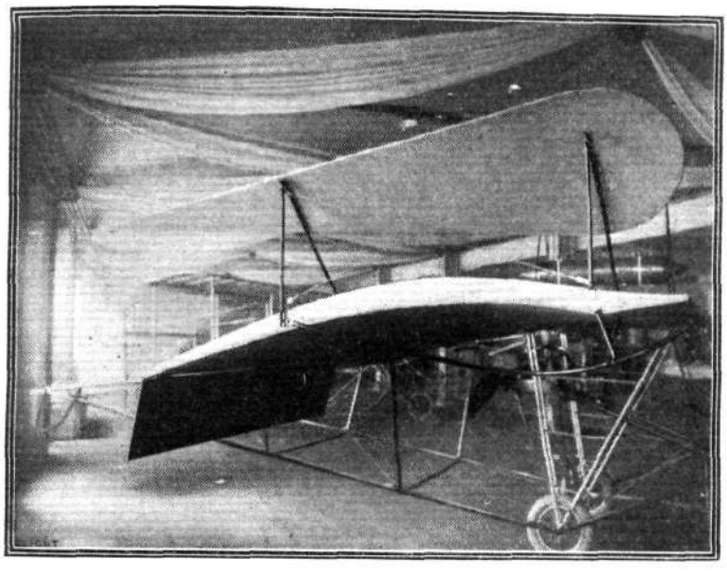
S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).
JAN. 17TH, Woolwich Common, 3.30 p.m. until dusk, Jan. 18th, Blackheath, 7.30 to 10 a.m.; Lee Aerodrome, 10.30 a.m. to 12.45 p.m. Members are requested to accelerate the construction of models intended for the club's first indoor exhibition, to be held at the Central Hall, High Street, Peckham, on the last Thursday in this month, 7 to 10 p.m. Admittance free. Every member is expected to exhibit.

CORRESPONDENCE.

An American Stabilizer.

[1821] In the January 10th issue of FLIGHT, page 49, mention is made of a new form of stabilizer that is being tried in America on a Curtiss biplane, and which, from the account, "materially increased its lateral stability." Four years ago in New York I tried out almost an identical device with Mr. Walden on a monoplane, but instead of using one large central plane there were two small flat ones, each tilted up on its inside edge, and mounted about 2 ft. above the extremity of each wing tip, as shown in the accompanying photograph. Like Mr. Fiske's arrangement, these small planes were supposed to combine the good qualities of a dihedral without any of the disadvantages, but I must admit that the result of experiments made at the time showed the machine to be more stable without them than when they were in place.

Whenever a side-gust struck these auxiliary surfaces the machine



would rock violently, so that they had to be discarded. Theoretically, they might have restored balance in the case of a side-slip, but as in those days one did not indulge in such things intentionally, and I never had the misfortune to do it accidentally, I never determined whether they would work or not. The machine was shown at the first aero-motor show in New York, and was commented upon in the technical press at the time. It would be interesting to know that, if the device used on the Curtiss biplane really does improve its lateral stability, whether a plain vertical fin mounted in the same position would not be equally effective.

G. M. DYOTT.

A Warning to Pilots.

[1822] After reading Mr. Harris Booth's interesting article on the subject of air speed indicators, I expected to find your last issue full of correspondence on the subject. Is it that pilots take no interest in the instrument which is going to be the means of saving innumerable lives, or is it that they think the liquid gravity controlled air speed indicator good enough?

I am a little doubtful about writing on this subject, as having myself placed a spring controlled air speed indicator on the market I do not want to appear to be pushing my own inventions; on the other hand, the matter is so important that I think it is my duty to back up what Mr. Booth has said on the subject.

Without going deeply into details as to the most usual types of accidents to aeroplanes, I think it may be safely stated that more occur due to "stalling" than to any other cause, consequently any instrument that can be depended upon to give an exact indication of the speed at which the machine is moving through the air must be of immense value, as provided that the speed is kept within the flying limits of the particular machine, stalling cannot take place.

Take an example of a machine capable of flying normally at 65 m.p.h., its most efficient climbing speed may be in the neighbourhood of 45 m.p.h., and its most efficient gliding speed will probably also be about 45 m.p.h. Fitted with a *spring-controlled* air speed indicator of reliable make, it will be quite safe to elevate the head of the machine to such an extent that the speed drops until it shows 45 m.p.h., and the pilot will then know that he is climbing *safely* at such an angle that he will arrive at a maximum height in the minimum time. (A small allowance is required for loading.) Now, supposing the motor slowly loses power, the pilot still keeping his speed indicator at 45 m.p.h. To do so he will find he has to move his elevator so as to climb less steeply, and the more the engine fails the more he will have to lower the head of the machine until in the extreme case the motor stops altogether. The head of the machine, to maintain the 45 m.p.h., will by this time have had to be lowered until the machine is planing at approximately its best gliding angle, and all this has been done simply by the pilot keeping the pointer of his air speed indicator on 45 m.p.h.

The above machine gliding at 45 m.p.h. will probably glide efficiently at something under this speed, so that the machine will always be well in hand by observing the air speed indicator, and keeping it anywhere between 40 and 50 m.p.h.

If a gust hits the machine, the indicator records the change in speed immediately, so that an inexperienced pilot with an air speed indicator can get better results all round than a more experienced pilot without such an instrument. All the previous remarks are based on having a *spring-controlled instrument*, and do not apply at all where a *gravity-controlled one* is used.

Returning to our machine climbing at 45 m.p.h., suppose as before the engine starts to lose power or the pilot elevates the head of the machine so much that the speed falls to such an extent that it begins to pancake. This means an acceleration downwards acting on the column of liquid, thereby causing the liquid to rise in the tube and to show a much higher speed than that which should be shown due to the pressure on the Pitot tube. The pilot gets a false impression of his speed, and if not very experienced he thinks he can put the head of the machine up still more, whereas the opposite movement is what is immediately necessary.

In the case of a machine gliding at its proper speed, the pilot through inattention or changes in the atmosphere may drop the speed of the machine somewhat. Acceleration downwards takes place, and the reading on the liquid air speed indicator may actually show a higher speed than before, although the speed of the aeroplane may be much slower and actually in a state of stalling.

There is not the slightest doubt that *liquid air speed gauges must go*, and in fact several other gravity-controlled instruments as well, and the sooner the better, as every pilot who goes aloft relying on one is relying on not only an instrument which gives wrong readings, but unfortunately gives a false sense of security at the very moment when the air speed indicator should be of the utmost value, namely, in bad winds, in climbing, in gliding and banking, and in landing.

I think Mr. Booth deserves great thanks from all interested in aviation for pointing out this important matter.

E. HOLLOCOOMBE CLIFT, A.F.Ae.S.

Sinclair Road, W.

[1823] With regard to Mr. Harris Booth's interesting communication on the failure of the Pitot tube liquid gauge to indicate changes of speed relatively to the air caused by gusts, it seems pertinent to remind your readers that a Pitot-tube anemometer,* with a spring control, and balanced for the inertia effects Mr. Booth discusses, was exhibited at the International Congress at the Paris Aeronautical Exhibition just over a year ago. With regard to inertia effects in general, instruments and apparatus for use on aeroplanes are being put forward in large numbers, whose action depends on the action of gravity on pendulum bobs, columns of mercury and so on.

Sometimes the models are pretty and ingenious mechanical arrangements, and work nicely on a table. But in all such cases the application of an ounce of theory, in the shape of the elementary rule that the effective weight of the columns of mercury, &c., is compounded of the earth's attraction and the reversed acceleration of the instrument relatively to the earth, can alone predetermine whether the apparatus is sound in principle and should be experimented with, or unsound and to be dropped.

If "practical" engineers prefer to try to find exceptions to Newton's laws of motion by mounting expensive full-size apparatus on aeroplanes, they are not the only people in the world spending money on schemes that are predestined to fail.

ARCHIBALD LOW.

[* Mr. Low presumably refers to the Toissiant Lepère air-speed recorder, described in FLIGHT for July 5th last, in which the two leads from the Pitot tube are connected to two chambers, each of which contains a concertina bellows, and so arranged that whilst the outsides of the latter are subjected to the Pitot tube pressures, their interiors are open to the atmosphere. A spring is incorporated in this instrument to regulate the movement of the bellows and of the pointer attached thereto.—ED.]

Aeronautical Courses for Students.

[1824] With your permission I wish to take the opportunity of replying to Mr. L. Blin Desbleds' letter, published in your issue of the 3rd inst., and to set forth as a matter of history, some of the facts relating to the aeronautical work at this Institution.

In the first place, however, let me clear the ground by pointing out that Mr. Posner's letter in your issue of December 20th, 1913, on which Mr. Desbleds comments, does not claim that the proposed club is the first of its kind, but that the aeronautical course at this Polytechnic "is believed to be the only complete course at present being given in England."

During the session 1908-09 Dr. R. Mullineux Walmsley, the Principal of the Northampton Polytechnic, and the writer, considered the question of inaugurating complete courses of instruction in aeronautics of a pioneer character, and requisitions were made to the educational authorities with this end in view. Before the end of April, 1909, it was definitely decided that the instruction should consist of :—(1) Lectures in Aeronautics; (2) Drawing Office Practice; (3) Laboratory; (4) Calculations.

Following these decisions it became necessary to find a special lecturer and instructor, and Dr. Walmsley, after making enquiries among well-known experts, approached Mr. Blin Desbleds in May, 1909. The provisional proposals were finally approved by the Governing Body in June, 1909, and Mr. Desbleds was appointed "Instructor in Aeronautical Engineering" early in July, 1909. Complete syllabuses for the session 1909-10 were in type early in July, 1909, before any announcement of similar work elsewhere had been made, and the whole scheme was widely referred to in the Press at that date. Mr. Blin Desbleds was announced as the lecturer, and for the other work he had as colleagues several full-time members of the staff, including the writer of this letter and Mr. R. O. Boswall, B.Sc.

It is worthy of note that in organising and developing these instruction courses no attempt was made to deal with the work from the popular point of view. They were, and are, a serious and definite attempt to place educational work in aeronautics on a sound engineering basis; and the Club recently formed requires as a condition that its members shall also attend for instruction a part or parts of the regular class work. For the session's work, 1909–10, twenty-three students joined for the full course of instruction in the four subjects, and, in addition, thirty-five for the lectures, nine for the drawing office work, giving totals as follows: Lectures 58, drawing 32, laboratory 23, calculations 23. The work was carried on through the session 1909–10, and was continued and considerably extended in the sessions 1910–11, 1911–12 and 1912–13, with Mr. Handley Page as lecturer.

In the current session specialisation is the key note, the rapid developments in the science and practice of aviation rendering this necessary. The lecturers and instructors are :—Mr. C. E. Larard, M.Inst.C.E., M.Inst.M.E, Head of the Mechanical Engineering Department; Mr. F. Handley Page, A.F.Ae.S.; Mr. G. A. Burls, M.Inst.C.E., M.I.A.E.; Mr. T. W. K. Clarke, B.A., A.F.Ae.S.; Mr. R. O. Boswall, B.Sc., A.F.Ae.S.

The lectures are divided as follows :—

(*a*) Three series by Mr. F. Handley Page, dealing with: (1) Principles and Data; (2) Design Data; (3) Machines.

(*b*) Aerial Propellers (Their Theory and Design). By Mr. T. W. K. Clarke (by special permission of the Superintendent of the Royal Aircraft Factory).

(*c*) Aero Engines. By Mr. G. A. Burls.

The other work in drawing, design, calculations and laboratories represents a considerable development on the original scheme.

I would emphasize the fact that now, as during the session 1909-10 and onwards, real laboratory work forms an essential part of the instruction. No course of instruction worthy of the name can be said to be "complete" without experimental work in a properly-equipped laboratory. At the Northampton Polytechnic Institute there is a special aeronautical laboratory containing much valuable apparatus suitable to the students' requirements, as well as other apparatus for research work, with the aid of which valuable researches have already been made, with subsequent publication. It is, therefore, claimed that the course offered is a "complete" one, and I have yet to learn that such a course as ours is available elsewhere, either in this country or abroad.

CHARLES E. LARARD.
Mechanical Engineering Department, Head of Department.
Northampton Polytechnic Institute,
London, E.C.
January 13th, 1914.

[1825] When writing as secretary of our new Aeronautical Club at the Northampton Polytechnic, Clerkenwell, E.C., no claim was made by me that we were the first club founded for this purpose. Others have been founded before, although lack of funds has generally limited the scope of their operations to the building of gliders or models.

We have, however, the good fortune to have been presented by the Governing Body of our Polytechnic with all the materials, free of charge, for a full-size power-driven aeroplane, as well as having the necessary tools to build it with, and workshop and laboratory accommodation to build it in.

Arrangements are made that, when the machine is complete, one of the club members who already has his pilot's certificate will instruct the members in flying.

The benefits of the club are evidently appreciated by the members who applied for particulars and have since joined. We had to limit the membership to those who would at least take the Institution's Aeronautical Workshop and Laboratory Course so that the work might be carried out on an engineering basis, as befits a club connected with a serious educational institution.

Anyone now desirous of joining the club should write to me at the address below. There are vacancies for three or four more members.

H. POSNER,
Secretary London Aero Club.
Northampton Institute.
St. John's Street, E.C.

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AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

Meeting.—The fifth meeting of the forty-ninth session will be held on Wednesday, January 21st, at 8.30 p.m., when Sir Alfred Keogh, K.C.B., F.R.S., will preside. Mr. Leonard Bairstow, A.R.C.Sc., will read a paper, to be followed by a discussion, on "The Stability of Aeroplanes," illustrated by experiments with model gliders.

Members are reminded that, under the Rules, they may introduce visitors to General Meetings.

Tickets for visitors, not introduced, may be obtained from the Secretary, 11, Adam Street, Adelphi, W.C.

BERTRAM G. COOPER, Secretary.

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IMPORTS AND EXPORTS, 1912-13.

AEROPLANES, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see FLIGHT, January 25th, 1912 :—

	Imports.		Exports.		Re-Exportation.	
	1912.	1913.	1912.	1913.	1912.	1913.
	£	£	£	£	£	£
January	619	12,097	2,412	4,005	—	1,510
February	3,110	17,361	36	3,447	—	690
March ...	640	20,425	950	1,924	600	1,042
April ...	4,820	15,593	72	5,524	50	1,413
May ...	7,494	51,241	1,350	3,726	154	830
June ...	7,928	14,905	419	1,408	300	1,106
July ...	13,794	14,469	5,376	3,812	967	1,250
August ...	8,559	17,993	1,342	2,805	2,040	510
September	6,575	19,409	2,885	6,263	1,626	1,470
October	6,836	21,041	3,128	3,674	605	2,163
November	8,455	16,607	2,002	3,306	405	1,449
December	11,290	22,955	1,824	6,851	3	1,439
	80,120	244,096	21,796	46,745	6,840	14,872

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